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FINAL REPORT

SPEECH OPTIMIZATION AT 9600 BITS/SECOND

VOLUME 2

REAL-TIME SOFTWARE AND HARDWARE

SUBMITTED TO
DEFENSE COMMUNICATIONS AGENCY

SEPTEMBER 30, 1980

Sylvania Systems Group
Communication Systems Division
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GTE Systems

FINAL REPORT

Speech Optimization at 9600 Bits/Second

Volume 2

Real-Time Software and Hardware

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This report describes the design and development of a real-time adaptive transform coder that transmits high-quality speech over a 9600 bps channel with bit-error rates of up to 1% without significant loss of speech fidelity. The report presents the results of our FORTRAN simulations on the adaptive transform coder which maximized the quality of the transmitted speech. Important aspects of the ATC algorithm which are optimized
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20. Abstract (cont'd)

were specification and transmission of the side-band information, accuracy of the pitch and voicing decisions, and error-protection of the important transmission parameters. Also included is the system design, detailed documentation, and program listings of the MAP-300 real-time implementation of the optimized ATC speech coder. Finally, the report includes a description of analog equipment GTE built to interface the MAP-300 to telephone handsets and tape recorders and a description of digital circuits (RS 423 compatible) to interface the MAP-300 to a modem.

This report is bound in two volumes. Volume I contains a description of the ATC system and the results of the FORTRAN simulations. Volume II contains all the information on the real-time system including documentation for implementing the ATC system on the MAP, listing of the MAP software, and documentation for the hardware built by GTE.

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Chapter 3

Real-Time Implementation

The GTE Sylvania Speech Processing System functions as a real-time, full duplex terminal of a digital voice communications system. As such, the GTE system accepts and digitizes analog voice input, processes it using an Adaptive Transform Coding (ATC) algorithm, and transmits the resulting serial bit stream at 9600 bits/second across a digital channel to a similar terminal. Because of the full duplex requirement, the system must simultaneously accept a similar bit stream, decode it to produce synthetic speech, and finally convert this synthetic speech to an analog waveform which it then plays out.

This chapter describes the design and operation of the GTE system and the hardware and software components used to construct it.

3.1 System Components

The GTE ATC system is implemented on a MAP-300 processor manufactured by CSP, Inc., Billerica, Mass. The MAP architecture consists of several independent processors, capable of parallel operation. Some of these processors are the Arithmetic Processor, used for high speed floating point operations; the Input/Output Scroll processors, of which there are three in the system, used for the Analog In, Analog Out, and Digtial In/Out functions; and the CSPU, which is used to control the other processors and also to perform general computation chores.

Attached to the MAP is a GTE-manufactured Speech Processing Interface (SPI). The SPI includes a handset with earphone and high-quality microphone, amplifiers, and band-limiting filters. The SPI interfaces to the ADAM and AOM scrolls. The Full Duplex Interface (FDI) is also

attached to the MAP. The FDI resides physically on the I/O scroll board and provides 9600 bps digital ports and their interfaces to the I/O scroll. Two additional SPI's and FDI's to be used on other MAP systems have been supplied by GTE.

The MAP is attached to a host PDP-11 which is used to load the MAP programs and to initialize and start them. Once the MAP has been started, it runs independently of the host. A block diagram of the system is shown in Figure 3-1.

The software components of the ATC system include modules supplied by CSP, Inc., as well as those written by GTE. Three categories of software are used in the ATC system. The first, the Fortran Control and Support programs, resides in the PDP-11 and is used for communication between the user and the MAP. The second category, Executive software, consists of the body of code that runs in the CSPU. This software is used to control and schedule all the processes in the MAP. The third category, MAP Functions, consists of the program modules that are loaded into the Arithmetic Processor and I/O Scroll processors. The scrolls require only one program each, but the Arithmetic Processor, because of limited memory, must be loaded with successive program modules and started for each. The CSPU Executive software performs this task.

3.2 System Design and Operation

The ATC system is composed of seven distinct processes. These are the Analog In process, the Analog Out process, the Digital In process, the Digital Out process, the Analysis process, the Synthesis process, and the Executive process. Figure 3-2 shows the function of and the relationship between the various processes. Conceptually, all of these

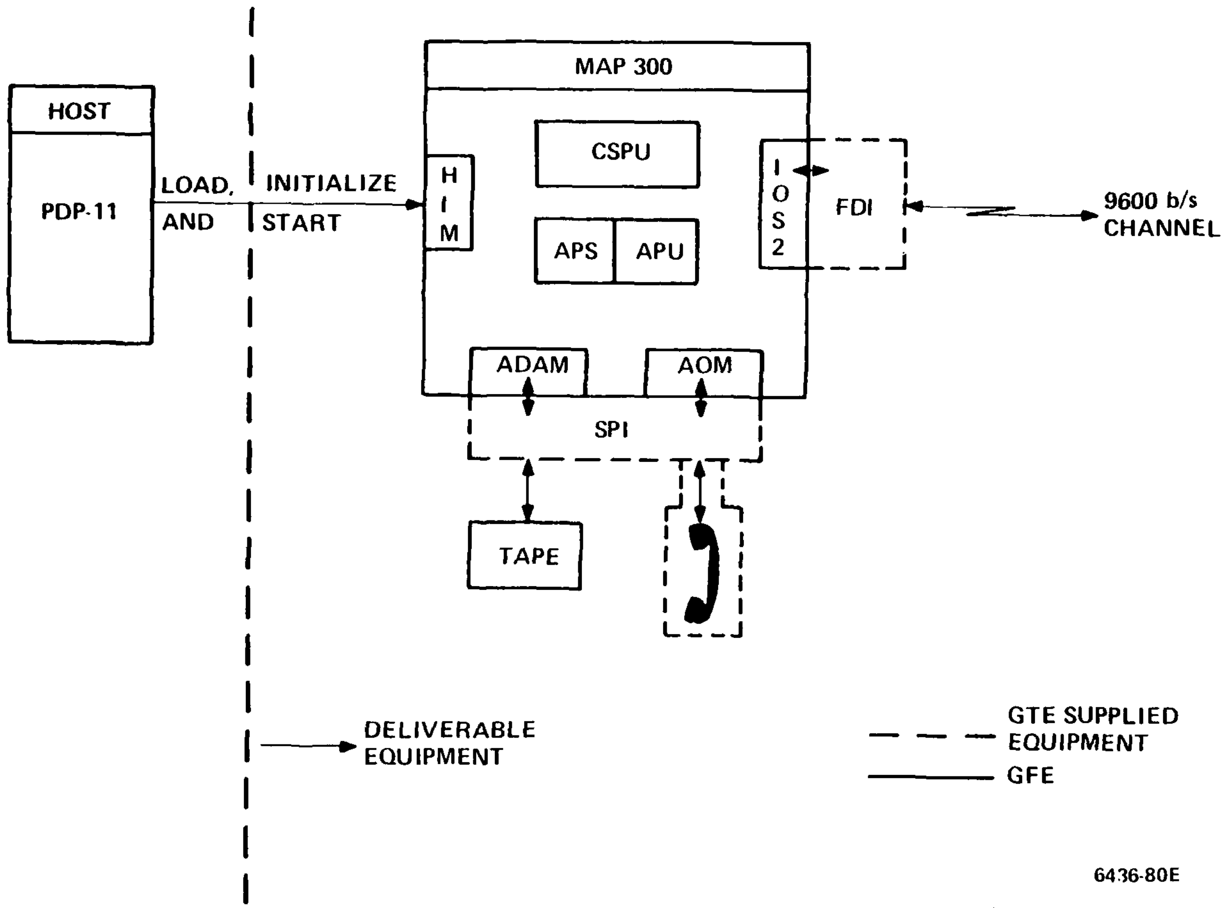


FIGURE 3-1: ATC SYSTEM COMPONENTS

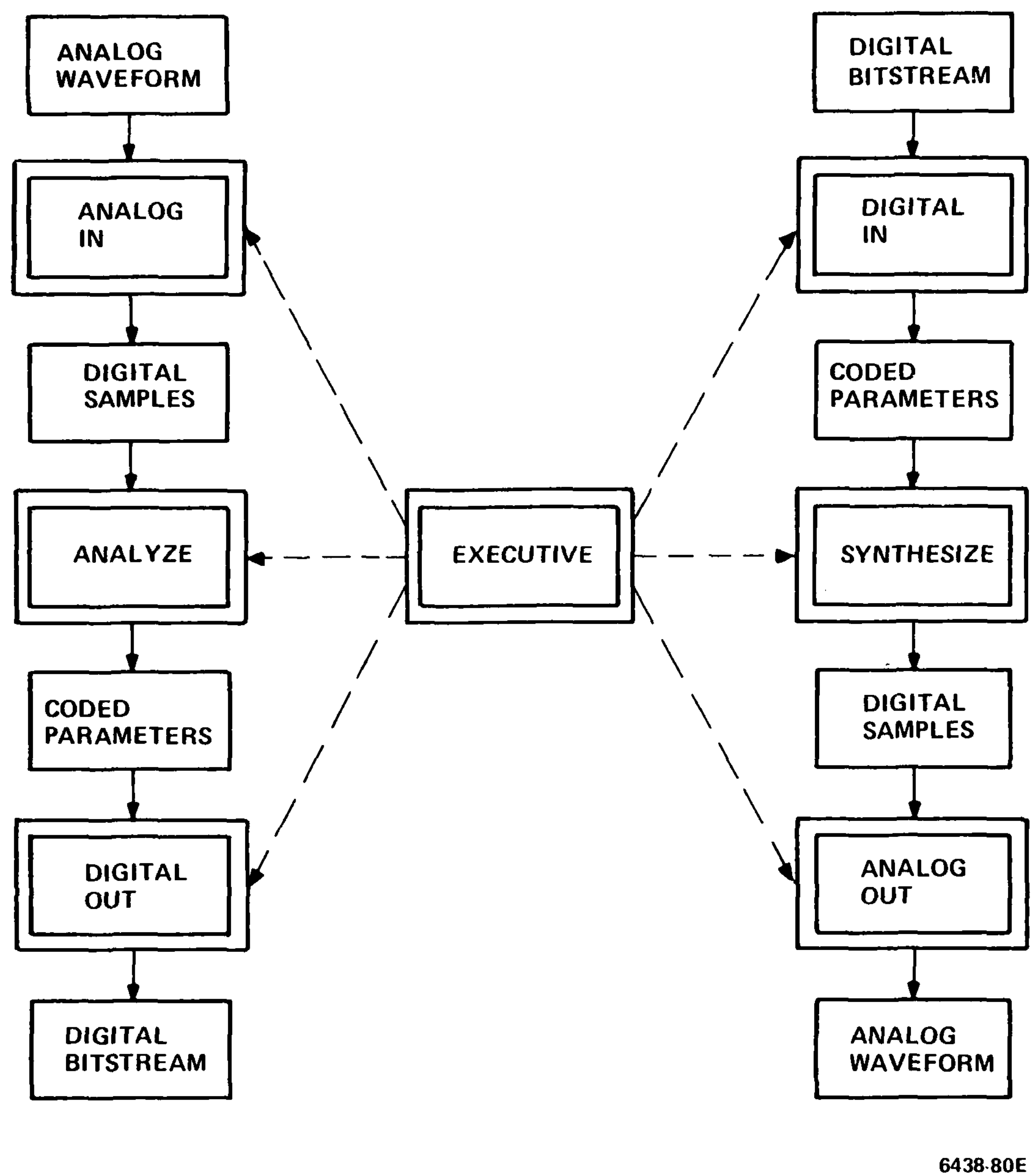


FIGURE 3-2: BASIC PROCESSES OF ATC SYSTEM

processes operate simultaneously, however, since at least portions of all of them must be executed by the CSPU or the Arithmetic Processor, both of which are sequential machines, the scheduling and synchronization of these processes is at the heart of the system design. Since the four I/O processes are essentially similar, they will be discussed first. The Analyze and Synthesize processes, which depend on their inputs on the Analog and Digital In processes, will be discussed next. Finally, the Executive process and the scheduling of the other processes will be presented.

3.2.1 Analog In Process

The Analog In process controls the A/D converter and makes the digitized samples available to the Analysis process. The Analog In process consists of three separate elements: the scroll program, the interrupt routine, and the background program. Figure 3-3 shows the components of the Analog In process.

3.2.1.1 A/D Scroll Program

This program runs in the ADAM scroll. It causes the A/D converter to operate at a pre-selectable sampling rate, which is 6400 samples/second for the purposes of the ATC system. As each sample is digitized, it is placed in the next (empty) location in the current buffer. Two buffers are used so that one can be filling while the data already in the other is used. Each buffer is 246 samples, or 37.5 milliseconds long. When a buffer is filled, an interrupt to the CSPU is generated by the scroll program, and the other buffer becomes the current buffer.

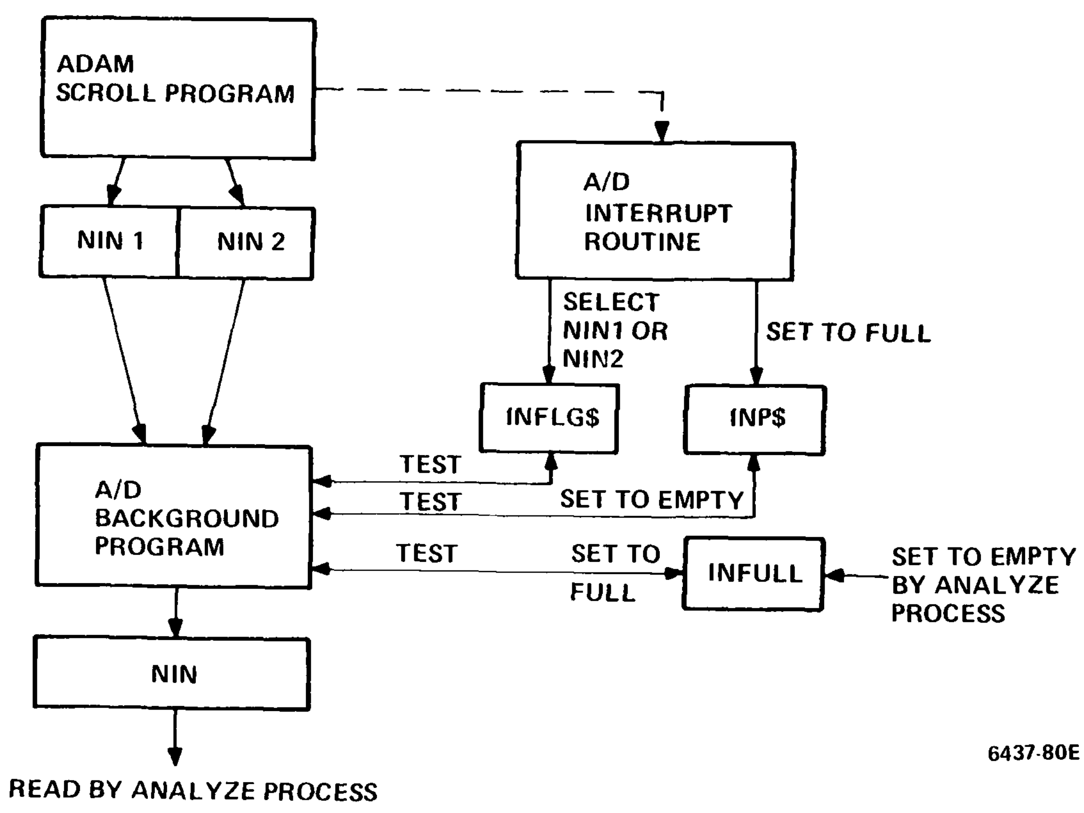


FIGURE 3-3: ANALOG IN PROCESS

This program is used as supplied by CSP, Inc., and as described in their documentation. The program used is ADMSD. The parameters supplied to it are ADAMPM (=63), the BID of the buffer containing the ADAM program; two identical sampling rates, each 6400 Hz; a control word which selects the internal clock, fixed point sampling, internal triggering, and no slow sampling; channel 1 select; and the double buffering pair where the input will be stored, NIN1 and NIN2.

3.2.1.2 A/D Interrupt Routine

The A/D interrupt routine runs in the CSPU at interrupt level 10. It clears INPS (integer scalar 106) to indicate that a new frame of samples is available, and it also clears or sets INFLGS (integer scalar 107) to indiciate that buffer NIN1 or buffer NIN2, respectively, contains the newest data.

3.2.1.3 A/D Background Program

The A/D background program runs in the CSPU. It is enabled by the combination of INPS clear and INFULL (integer scalar 110) clear, which indicates that the previous data has been used by the Analysis process. The background process copies the new data from NIN1 or NIN2, depending on the state of INFLGS, into the analysis buffer, NIN. Finally, it sets INFULL and exists.

3.2.2 Analog Out Process

The Analog Out process is similar to the Analog In process except that the data flow is reversed. The Analog Out process consists of the D/A Scroll program, the D/A interrupt routine, and the D/A background program. Figure 3-4 shows the components of the Analog Out process.

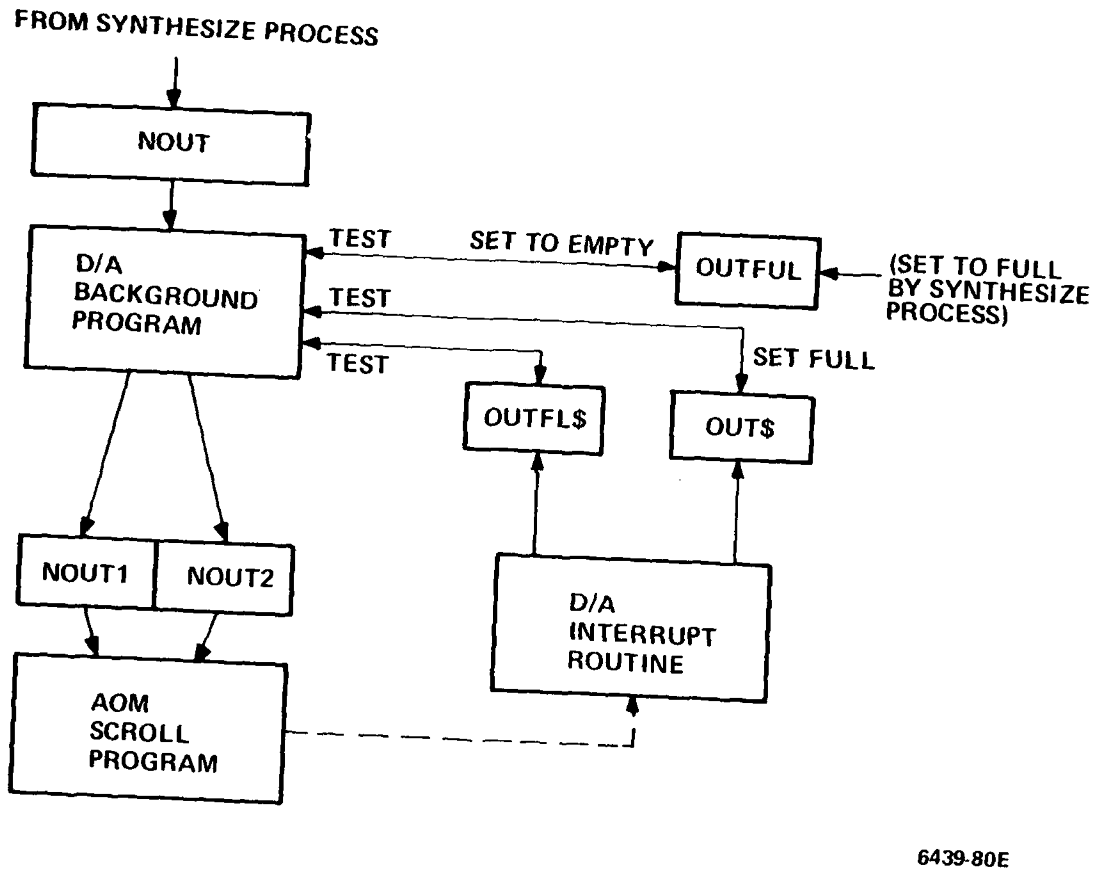


FIGURE 3-4: ANALOG OUT PROCESS

3.2.2.1 D/A Scroll Program

This program runs in the AOM scroll. It controls the D/A converter and uses a double buffering scheme similar to that used by the A/D scroll program. As each of the two buffers is emptied, the program generates a Device 22 interrupt to the CSPU. This program is used as supplied by CSP, Inc., and as described in their documentation. The program module used is AOMID. The parameters supplied to it are AOMPM, (=62), the BID where the AOM program is stored; a sampling frequency divider which is 1; a control word which selects fixed point output, single channel mode, and external triggering; the double buffering pair which stores the output, NOUT1 and NOUT2; and an offset, which is 2. The AOM program produces two channels of output, one of which is the data from the MAP and one of which is a ramp from 0 to 491.

3.2.2.2 D/A Interrupt Routine

The D/A interrupt routine runs in the CSPU at level 9. It clears OUTS (integer scalar 104) to indicate that a buffer has been emptied. It also clears and sets the flag OUTFLS (integer scalar 105) to indicate that buffer NOUT1 or buffer NOUT2, respectively, is the buffer most recently emptied and, hence, available.

3.2.2.3 D/A Background Program

The D/A background program module, called LOBUF, runs in the CSPU and is enabled by the combination of OUTS clear and OUTFUL (integer scalar 111) set, indicating that the Synthesis process has made new data available for output. If synchronization has been acquired, the

background program copies the new data from buffer NOUT into either buffer NOUT1 or buffer NOUT2, depending on the state of OUTFLS. If the system is not in synchronization, the relevant output buffer is set to zero. Finally, the background program clears OUTFUL, indicating that NOUT is available for filling by the Synthesis process.

3.2.3 Digital In Process

The Digital In process controls the digital input from the I/O scroll, examines the digital data to determine or confirm synchronization, and makes a frame of digital data available to the Synthesis process. The Digital In process consists of three components: the I/O scroll program, the Receiver interrupt routine, and the Receiver background program. Figure 3-5 shows the components of the Digital In process.

3.2.3.1 I/O Scroll Program

This program, which runs in the IOS2 Scroll, both transmits and receives digital data, and, thus, is a component of both the Digital In and the Digital Out process. This GTE written program is called LINE. It uses two sets of double buffers. One set, RECV1 and RECV2, stores the incoming bits from the modem. The other set, SEN1 and SEN2, store the bits to be output to the modem. As either of the receive buffers is filled, an interrupt from Device 16, line 2 to the CSPU is generated, and the other receive buffer begins to fill. Similarly, as either of the send buffers is emptied, an interrupt from Device 16, line 1 to the CSPU is generated, and the next bit to be output is taken from the other send buffer. All four of these buffers are 369 bits long and 16 bits wide. However, only the low order bit from each 16-bit word contains

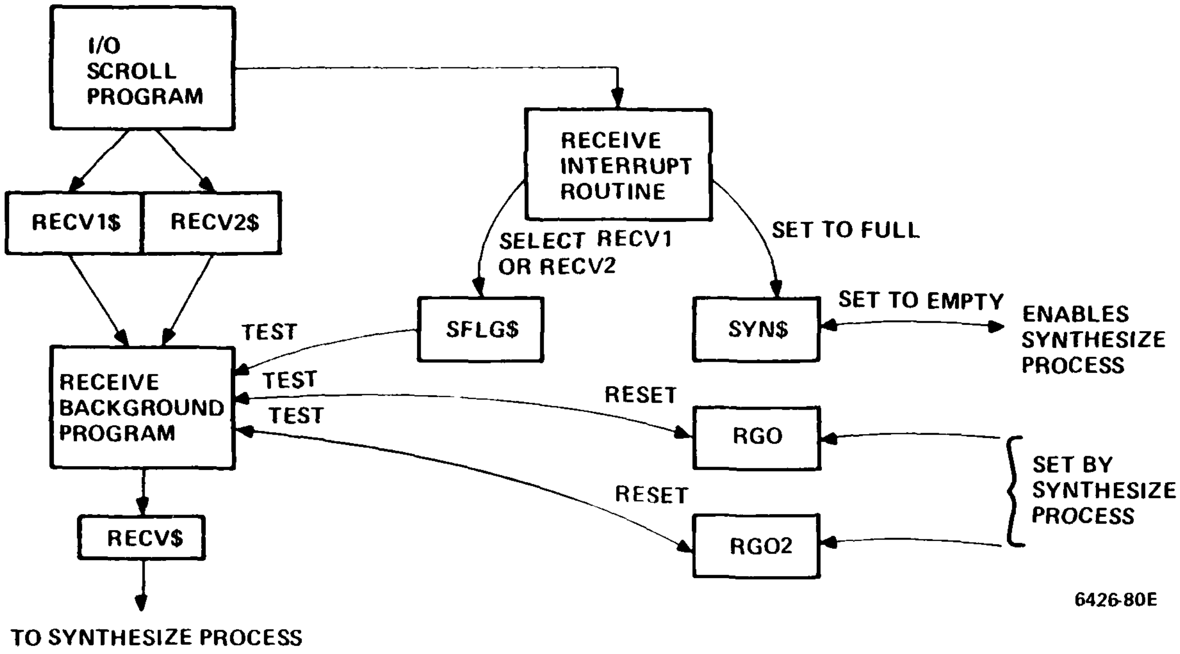


FIGURE 3-5: DIGITAL IN PROCESS

the digital data. The reader is referred to section 3.4 for the meanings of the other bits.

3.2.3.2 Receive Interrupt Routine

The Receive Interrupt routine runs in the CSPU at level 7. It has two functions, first, to keep track of which receive buffer has the newest data and to transmit this information to other processes, and, second, to confirm that synchronization is still valid.

When an interrupt from the receive portion of the I/O Scroll program occurs, the Receive interrupt routine clears SYNS (integer scalar 102) and clears or sets flag SFLGS (integer scalar 103) to indicate that buffer RECV1 or buffer RECV2, respectively, has been filled.

When the ATC system has achieved synchronization (integer scalar 118, RSYN, greater than zero), the bit assumed to be the sync bit for the new data is compared to the sync bit from the previous buffer. If these bits are opposite, synchronization is assumed to be still good. It they are the same, and it is the fourth non-alternating sync bit without two consecutive correctly alternating sync bits intervening, synchronization is declared lost (RSYN is cleared). The location of the sync bit in the data buffer is stored in SYNCS (integer scalar 117).

3.2.3.3 Receive Background Program

The Receive background program runs in the CSPU and is enabled by flag RGO (integer scalar 114) being set. This flag is set by the Synthesis process which is in turn enabled by SYNS being clear. The Receive background program sets SYNS to one on entry.

The Receive background program performs several functions. First, it must collect a new frame of data. This consists of finding the newest sync bit location, and using the 369 previous received bits as the frame. This is implemented by having the background program copy the new data into another set of contiguous buffers, BF1, BF2, and BF3. If RECV2 contains the new data, it is copied into BF2. If RECV1 contains the new data, it is copied into both BF1 and BF3. Then, the 369 data bits prior to the sync bit location are copied into buffer RECV. This double copying of RECV1 assures that, regardless of the position of the synchronization bit in the new frame, the 369 data bits previous to it are contained (contiguously) in the triple length buffer.

Second, the background program must acquire synchronization. That is, it must determine the position of the sync bit in the frame of data. The background program builds a histogram containing 369 bins, one for each bit in the frame. When it receives a new frame of data, the new frame is compared bit for bit against the previous frame. If a given bit alternates in the two frames, the corresponding bin in the histogram is incremented. If it does not alternate, the bin is cleared. This process continues until one bin both exceeds the acquired threshold (10.) and is a unique maximum in the histogram. When this occurs, the bit position corresponding to the maximum bin is declared the Sync position and is stored in SYNCS (integer scalar 117) and RSYN (integer scalar 118) is set to one to indicate that synchronization has been acquired. Until synchronization is acquired, the Receive background process terminates at this point.

Once synchronization has been acquired, the background process must present an actual frame of data, one that has the sync bit at the beginning of the frame, for further processing. To do this, it copies the 369 bits previous to the sync bit of the newest frame from the triple length buffer (BF1, BF2, and BF3) into the receive processing buffer RECVS. This procedure is shown in Figure 3-6. Reasons of efficiency require that the new actual frame be present as a contiguous block within the triple length buffer, in order that a "block move" instruction can be used for the copying and no "corner turning" test is needed.

Once a new frame of data has been copied into RECVS, transmission bit errors are detected and corrected if possible. A (63, 45) BCH code is used to protect 45 bits of the sideband parameters with 18 protection bits. These 63 bits are decoded using a table-look-up procedure for efficiency. For each of the 63 transmitted bits, there are three associated values (Table 3-1). Three residues S_1, S_3, and S_5 are computed by exclusive-or'ing the appropriate value for each bit that is set into each sum. If each of these residues is zero, no transmission errors are detected, and the 45 data bits are used as received.

If the residues are not all zero, the number of errors is determined by computing three syndromes σ_1, σ_2, and σ_3, and a determinant, which is

$$S_1^3 + S_3$$

If this determinant is zero, one error has occurred. σ_1 is set to one and σ_2 and σ_3 are zeroed. Otherwise,

$$\sigma_1 = S_1$$

$$\sigma_2 = S_1^2 S_3 + S_5/(S_1^3 + S_3)$$

$$\sigma_3 = (S_1^3 + S_3) + S_1\sigma_2$$

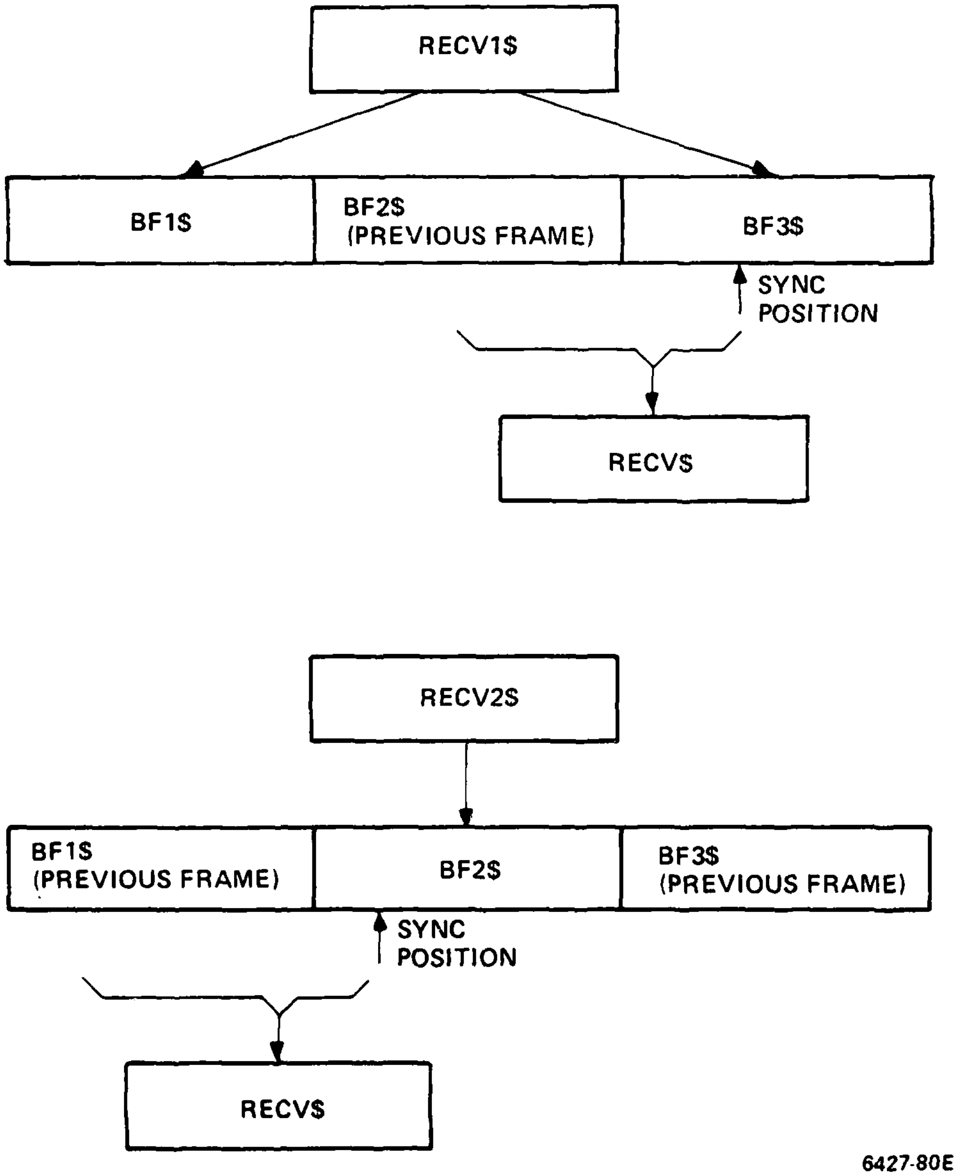


FIGURE3-6: FRAME COLLECTION

Bit Position	S_1 (decimal)	S_3	S_5	Bit Position	S_1 (decimal)	S_3	S_5
0	33	57	63	33	56	17	30
1	49	62	42	34	28	59	20
2	57	23	13	35	14	15	24
3	61	43	55	36	7	40	16
4	63	13	27	37	34	5	33
5	62	25	18	38	17	24	62
6	31	58	28	39	41	3	21
7	46	54	41	40	53	8	39
8	23	22	15	41	59	1	58
9	42	18	10	42	60	57	44
10	21	51	12	43	30	62	9
11	43	14	8	44	15	23	14
12	52	17	49	45	38	43	53
13	26	59	31	46	19	13	38
14	13	15	43	47	40	25	5
15	39	40	50	48	20	58	6
16	50	5	29	49	10	54	4
17	25	24	22	50	5	22	57
18	45	3	37	51	35	18	46
19	55	8	7	52	48	51	52
20	58	1	59	53	24	14	25
21	29	57	19	54	12	17	47
22	47	62	35	55	6	59	11
23	54	23	3	56	3	15	51
24	27	43	2	57	32	40	34
25	44	13	61	58	16	5	60
26	22	25	23	59	8	24	40
27	11	58	26	60	4	3	48
28	36	54	45	61	2	8	32
29	18	22	54	62	1	1	1
30	9	18	36				
31	37	51	56				
32	51	14	17				

TABLE 3-1: RESIDUE TABLE TBPSM

The powers are formed using two tables TBRPC and TBPRC, shown in Table 3-2. These are essentially logarithm and anti-logarithm tables for Galois field arithmetic. For example, S_1^2 is found by using S_1 as an index to TBRPC, doubling the value found in the table (modulo 63) and using the result as an index into TBPRC. The division is performed similarly.

The Chien search procedure (refer to Section 2.4) is used to determine the position of the errors. This procedure uses three additional tables, TBAL1, TBAL2, and TBAL3, shown in Table 3-3, to look up the products $\sigma_1\alpha$, $\sigma_2\alpha^2$, and $\sigma_3\alpha^3$ which replace σ_1, σ_2, and σ_3. For each bit position, σ_1, σ_2, and σ_3 are exclusive or'ed together. If the result is unity, that bit position is in error and is complemented.

When transmission errors have been corrected, the background process must deserialize the bitstream into code words of various lengths. This deserialization procedure is performed in two parts. The first part deserializes the sideband parameters and makes them available to the Synthesis process. Figure 3-7 shows a map of the data frame and the bits allocated to each of the sideband parameters. The sideband code words are stored in buffer RQPBS, which is later read by the Synthesize process.

Before the second part of the deserialization procedure, deserialization of the Discrete Cosine Transform (DCT) coefficients can be executed, the word lengths of the DCT's must be obtained from the Synthesize process, which has determined these word lengths from the sideband parameters. To avoid delays and the consequent buffering, the transmitted data consists of the current frame of sideband information and the

TBRPC				TBPRC			
S	Index	S	Index	Index	S	Index	S
0	0	32	5	0	1	32	9
1	0	33	62	1	2	33	18
2	1	34	25	2	4	34	36
3	6	35	11	3	8	35	11
4	2	36	34	4	16	36	22
5	12	37	31	5	32	37	44
6	7	38	17	6	3	38	27
7	26	39	47	7	6	39	54
8	3	40	15	8	12	40	47
9	32	41	23	9	24	41	29
10	13	42	53	10	48	42	58
11	35	43	51	11	35	43	55
12	8	44	37	12	5	44	45
13	48	45	44	13	10	45	25
14	27	46	55	14	20	46	50
15	18	47	40	15	40	47	39
16	4	48	10	16	19	48	13
17	24	49	61	17	38	49	26
18	33	50	46	18	15	50	52
19	16	51	30	19	30	51	43
20	14	52	50	20	60	52	21
21	52	53	22	21	59	53	42
22	36	54	39	22	53	54	23
23	54	55	43	23	41	55	46
24	9	56	29	24	17	56	31
25	45	57	60	25	34	57	62
26	49	58	42	26	7	58	63
27	38	59	21	27	14	59	61
28	28	60	20	28	28	60	57
29	41	61	59	29	56	61	49
30	19	62	57	30	51	62	33
31	56			31	37		

TABLE 3-2: TBRPC AND TBPRC TABLES

σ	$\sigma_1\alpha$ TBAL1	$\sigma_2\alpha^2$ TBAL2	$\sigma_3\alpha^3$ TBAL3	σ	$\sigma_1\alpha$ TBAL1	$\sigma_2\alpha^2$ TBAL2	$\sigma_3\alpha^3$ TBAL3
0	0	0	0	32	3	6	12
1	2	4	8	33	1	2	4
2	4	8	16	34	7	14	28
3	6	12	24	35	5	10	20
4	8	16	32	36	11	22	44
5	10	20	40	37	9	18	36
6	12	24	48	38	15	30	60
7	14	28	56	39	13	26	52
8	16	32	3	40	19	38	15
9	18	36	11	41	17	34	7
10	20	40	19	42	23	46	31
11	22	44	27	43	21	42	23
12	24	48	35	44	27	54	47
13	26	52	43	45	25	50	39
14	28	56	51	46	31	62	63
15	30	60	59	47	39	58	55
16	32	3	6	48	35	5	10
17	34	7	14	49	33	1	2
18	36	11	22	50	39	13	26
19	38	15	30	51	37	9	18
20	40	19	38	52	43	21	42
21	42	23	46	53	41	17	34
22	44	27	54	54	47	29	58
23	46	31	62	55	45	25	50
24	48	35	5	56	51	37	9
25	50	39	13	57	49	33	1
26	52	43	21	58	55	45	25
27	54	47	29	59	53	41	17
28	56	51	37	60	59	53	41
29	58	55	45	61	57	49	33
30	60	59	53	62	63	61	57
31	62	63	61	63	61	57	49

TABLE 3-3: CHIEN SEARCH TABLES

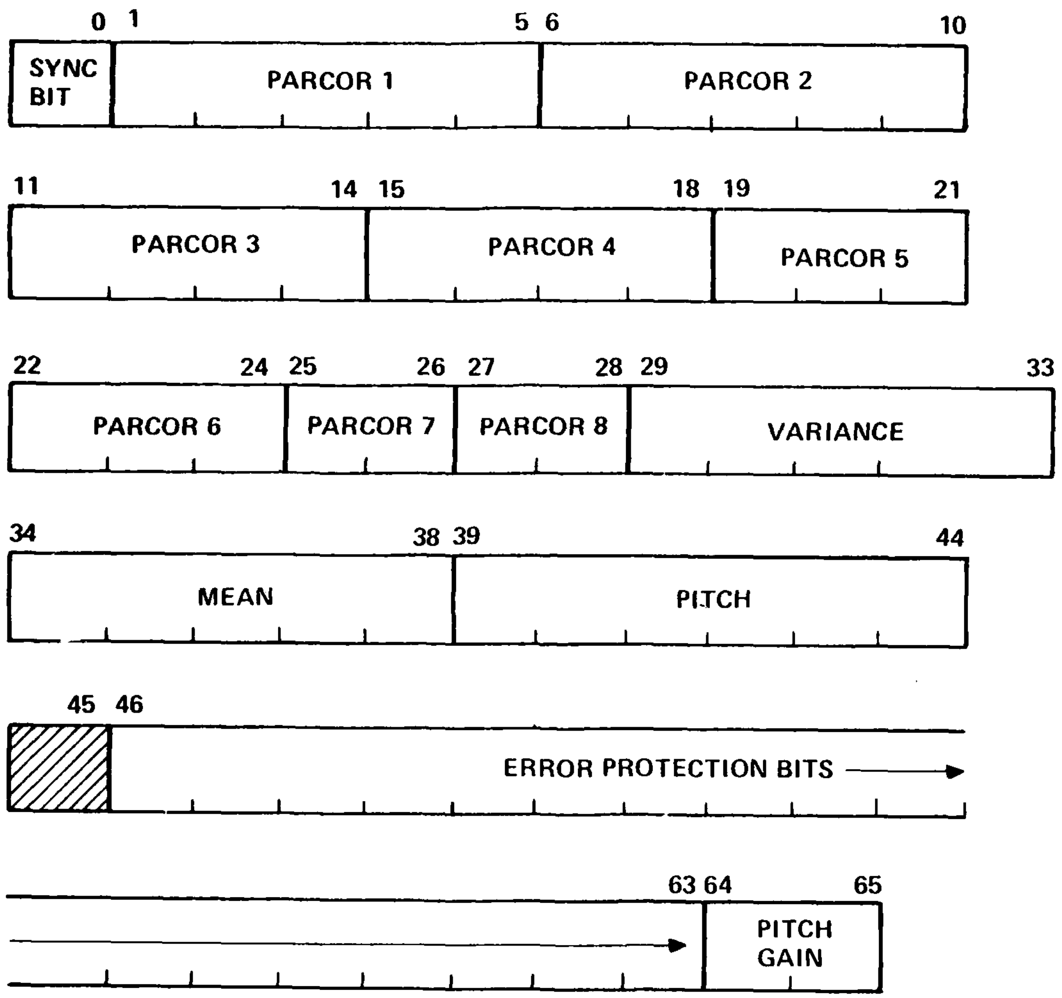


FIGURE 3-7: PARAMETER FRAME MAP

previous frame of DCT coefficients. Thus, the Synthesize process determines the DCT code word lengths for a given frame based on sideband information received in the previous frame. It passes this information to the Receive background program in buffer RIBITS and sets RG02 (integer scalar 115) to 1 to indicate that new data is present. The Receive background program waits for RG02 to be set before it proceeds with the DCT deserialization and clears RG02. The deserialized DCT coefficients are stored in buffer RQTDCT. The Receive background program then terminates. Figure 3-8 shows the organization of the complete Receive background program.

3.2.4 Digital Out Process

The Digital Out process serializes and protects the data to be transmitted and controls the digital output to the I/O scroll. The Digital Out process consists of three components: the I/O scroll program, the Transmit interrupt routine, and the Transmit background program. Figure 3-9 shows the components of the Digital Out process.

3.2.4.1 I/O Scroll Program

The transmitter function of the I/O scroll program is described in subsection 3.2.3.1. This program puts out the low order bit of each half-word in the double buffer pair SEN1 and SEN2 and generates an interrupt when either buffer is emptied.

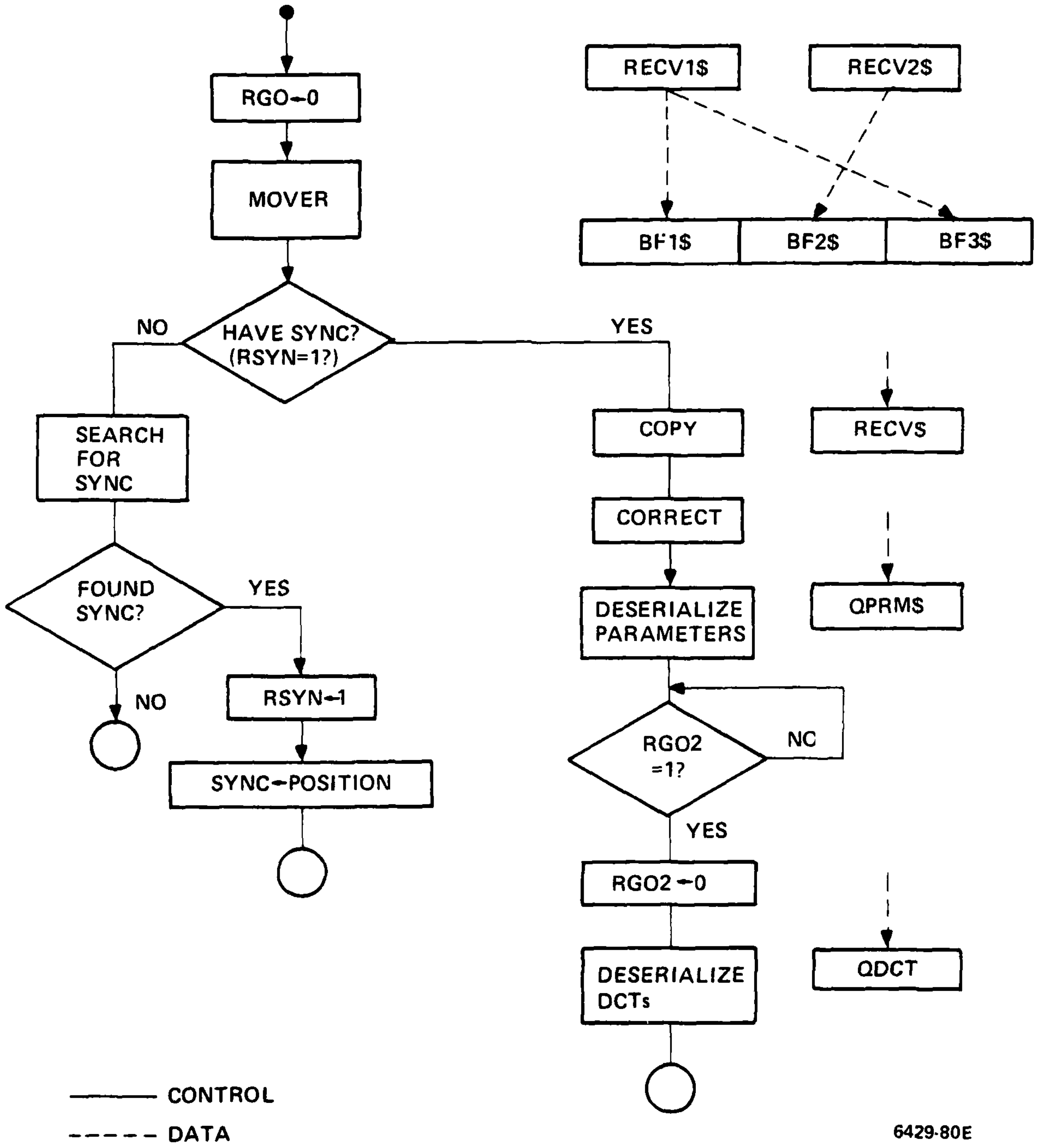


FIGURE 3-8: RECEIVE BACKGROUND PROCESS

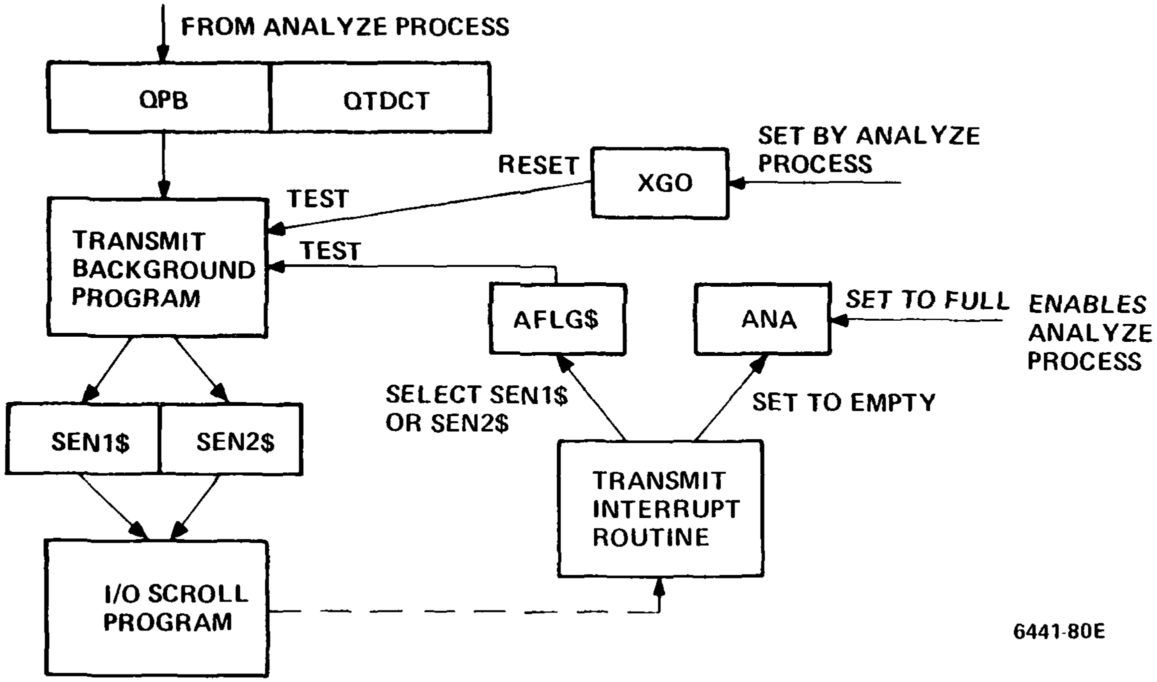


FIGURE 3-9: DIGITAL OUT PROCESS

3.2.4.2 Transmit Interrupt Routine

The Transmit interrupt routine runs in the CSPU at level 7. Its function is to keep track of which transmit buffer, SEN1 or SEN2, has been most recently emptied, and to transmit this information to the Transmit background program.

When an interrupt from the transmit portion of the I/O scroll program occurs, the Transmit interrupt routine clears ANAS (integer scalar 100) to indicate that a transmit buffer has become empty and clears or sets AFLG (integer scalar 101) to indicate that buffer SEN1 or SEN2, respectively, has been most recently emptied.

3.2.4.3 Transmit Background Program

The Transmit background program runs in the CSPU and is enabled by flag XGO (integer scalar 115) being set. This flag is set by the Analysis process, which is in turn enabled by ANAS being clear. The Transmit background process sets ANAS to one on entry.

The Transmit background program first transforms the quantized sideband parameters from buffer QPBS and the quantized DCT coefficients from buffer QTDCTS into a bitstream which is built up in buffer SENS. The SENS buffer contains 369 half-words, the low order bits of which form the bitstream. The function of the higher order bits is described in Section 3.4.

The serialization procedure is performed in two parts. The first part serializes the sideband information according to the frame map in Figure 3-7. This part also skips 18 words in SENS to allow for later

insertion of protection bits. The second part of the serialization procedure serializes the DCT coefficients. These coefficients are those obtained from the previous frame. That is, the DCT coefficients are delayed in the Analysis process by one frame before being serialized, while the sideband parameters are those from the current frame and experience no additional delay. The quantized DCT coefficients are to be transmitted as code words of variable lengths. The background program obtains the length for each coefficient from buffer IBITS. The DCT coefficients in buffer QTDCTS are ordered by word length. These word lengths are constrained to be monotonically decreasing, so that the word length of each DCT coefficient must be equal to or less than that of the previous coefficient.

When all parameters and coefficients have been serialized, the background program generates BCH error protection bits for the resulting bit stream. The protection bits are found using a table look-up procedure. Table 3-4 shows the protection table, TBENC. For each of the 45 bits that is set, the bit position is used as an index into this table. The 18-bit values found from the table are exclusive or'ed together to form the protection bits. Each of the 18-bit values occupies two half words, the 15 least significant bits in one half word and the remaining 3 bits in an adjacent half word.

When all error correction bits have been inserted into buffer SENS, the background program copies this buffer into either SEN1S or SEN2S, depending on AFLG being clear or set. The Transmit background program then terminates.

Bit Position	Value Low Order	Value High Order	Bit Position	Value Low Order	Value High Order
0	30764	7	23	21534	7
1	17466	4	24	21027	4
2	8733	2	25	10513	6
3	4336	5	26	5256	7
4	28843	5	27	29288	4
5	16505	1	28	14644	2
6	22544	3	29	7322	1
7	21540	6	30	30305	7
8	10770	3	31	17180	0
9	27941	6	32	8590	0
10	13970	7	33	4295	0
11	25445	4	34	2147	4
12	12722	6	35	1073	6
13	6361	3	36	536	7
14	29760	2	37	31008	4
15	14880	1	38	15504	2
16	25916	7	39	7752	1
17	19122	4	40	30472	7
18	9561	2	41	17320	4
19	4780	5	42	8660	2
20	29050	5	43	4330	1
21	16529	5	44	28761	7
22	22628	1			

TABLE 3-4: ERROR PROTECTION ENCODING TABLE TBENC

3.2.5 Analyze Process

The Analyze process performs the Adaptive Transform Coding algorithm on the digital speech waveforms supplied to it. The result of each instance of this process is a frame of quantized and coded sideband parameters and Discrete Cosine Transform coefficients.

The Analyze process is composed of six functional procedures, each of which consists of one or more array functions. The entire Analyze process runs in the Arithmetic Processor portion of the MAP. The six functional procedures are: Cycle Delay Lines, Compute DCT Coefficients, Compute and Quantize Sideband Parameters, Determine Basis Spectrum, Bit Allocation, and DCT Coefficient Quantization. The relationships of these procedures are shown in Figure 3-10.

3.2.5.1 Cycle Delay Lines Procedure (FCB 237, PBFCB 172)

The Cycle Delay Lines procedure partially implements the buffering between processes required by the ATC system. It consists of the single array function VMOV1, as shown in Figure 3-11. The buffer delays implemented in VMOV1 are shown in Figure 3-12.

VMOV1 first moves the quantized parameters (QPRM) computed in the previous instance of the Analyze process to the buffer (AQPB) used as input by the Transmit background program. Then, it cycles two buffer delay lines, one for the DCT coefficients (QTDCT1) and one for the corresponding bit allocations (MIBIT4). The outputs of these delay lines are moved to input buffers (AQTDCT and AIBIT4) used by the Transmit background program. The delay of one frame in the DCT coefficients and bit assignments is required for the proper operation of the Synthesize process. VMOV1 also sets flag XGO (integer scalar 115) which enables the Transmit background program to run.

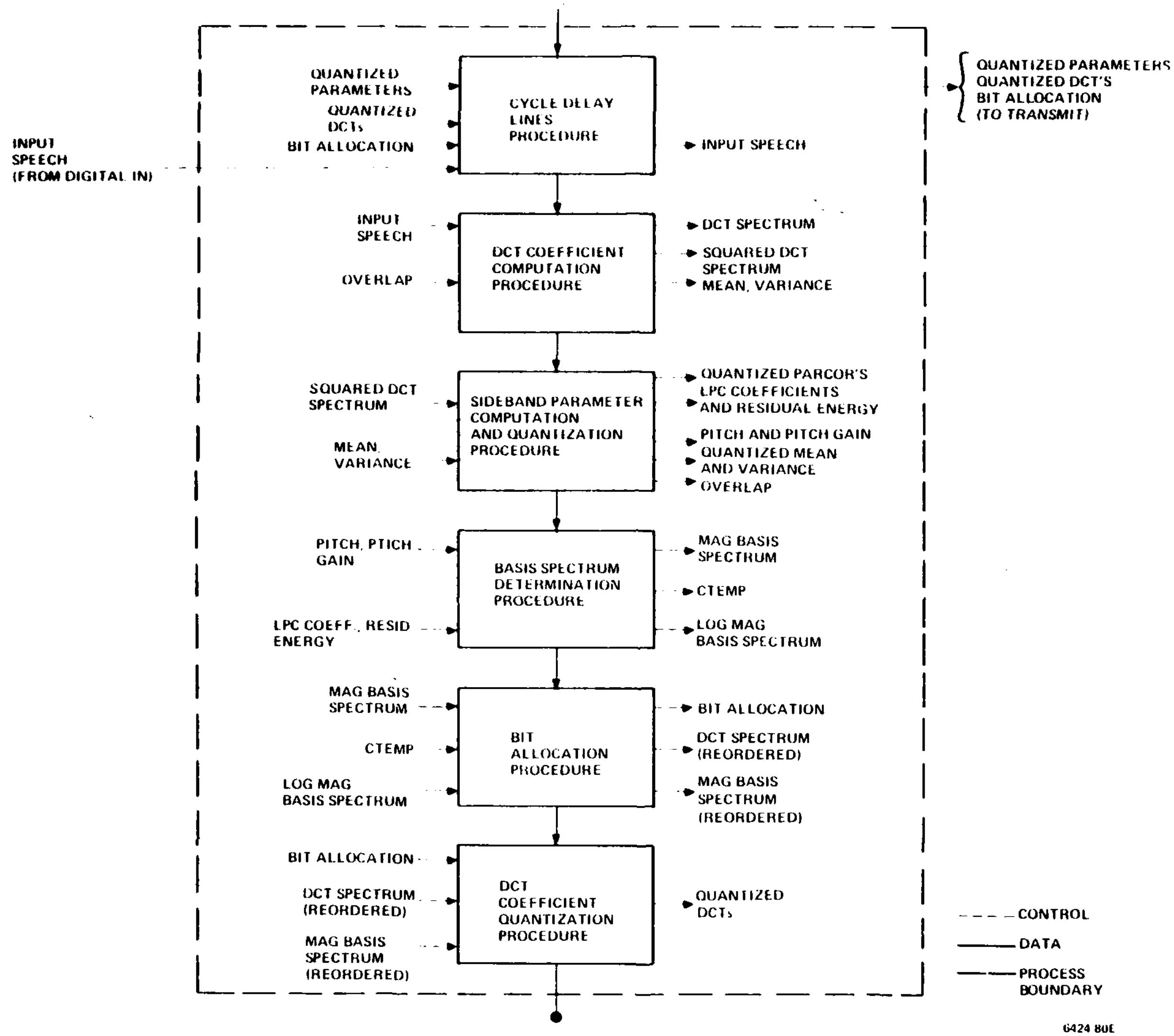


FIGURE 3-10: ANALYZE PROCESS

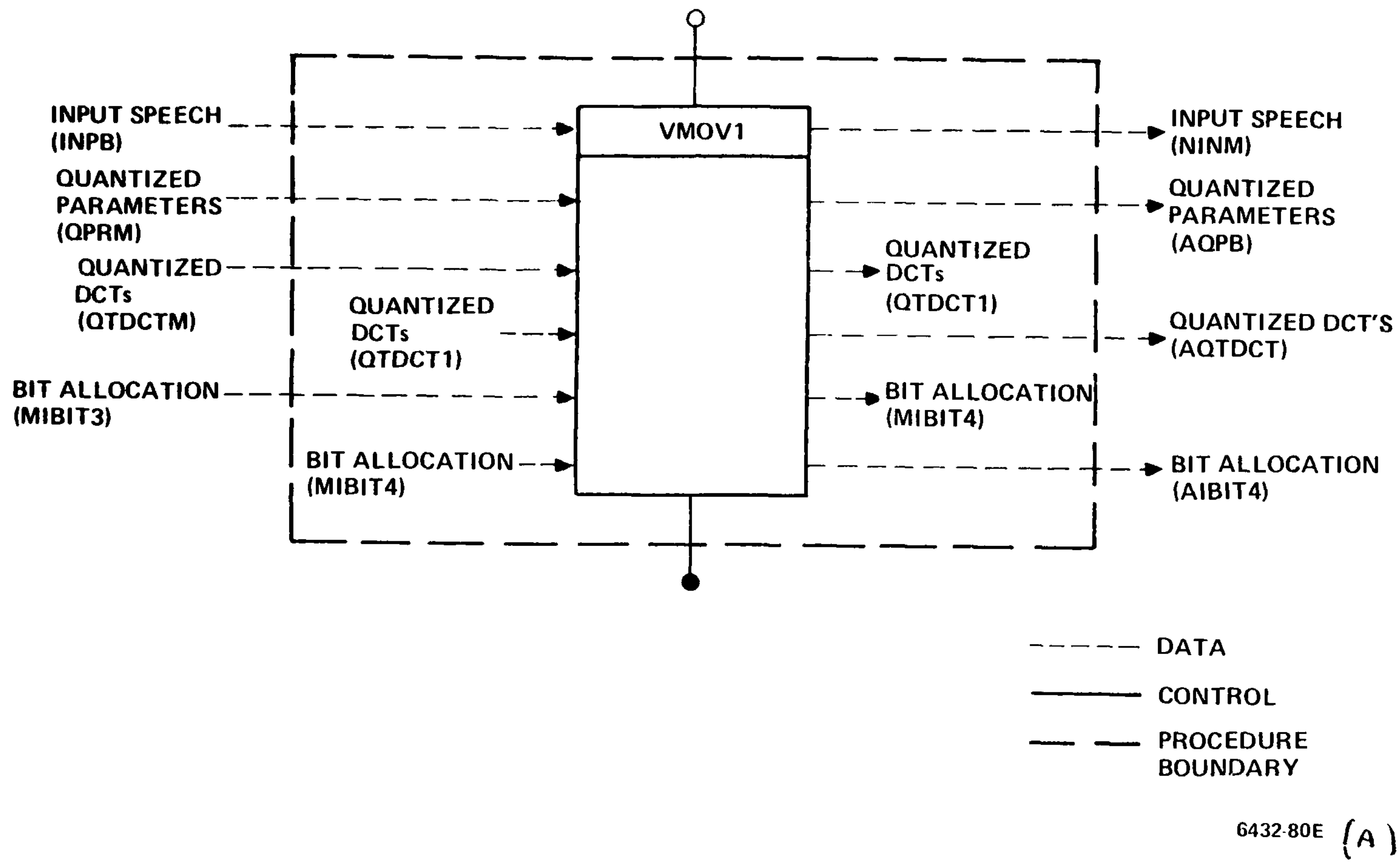
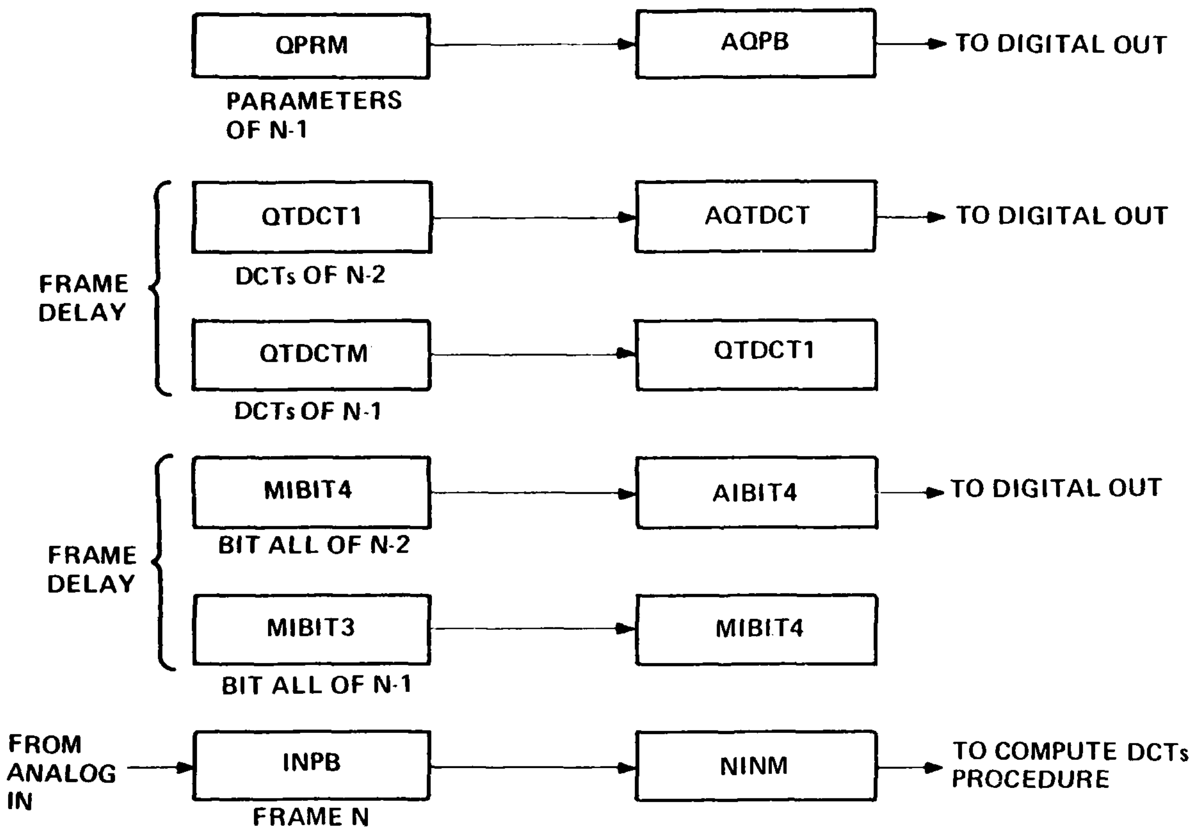


FIGURE 3-11: CYCLE DELAY LINES (ANALYZE)



6444-80E

FIGURE 3-12: VMOV1 OPERATION FOR FRAME N

3.2.5.2 Compute DCT Coefficients Procedure

The Compute DCT Coefficients procedure is used to find the Discrete Cosine Transform representation of the current input frame. This procedure performs this transformation by using the appropriate pre-and post-processing around a Fast Fourier Transform. In addition, it performs the reformatting of the input data and the input frame overlapping.

This procedure consists of three array functions: MPFDVM, FFTN (supplied by CSPI), and MPDCTM. The relationships between these array functions are shown in Figure 3-13.

3.2.5.2.1 MPFDVM (FCB240, PBFCB 153)

MPFDVM converts the data in NINM from fixed point to floating point, concatenates these 246 samples with the last 10 input samples of the previous frame, computes and removes the mean and variance of the frame of 256 samples, and reorders the frame in preparation for the following FFT. The reordering algorithm, given by Makhoul[3], consists of generating a 256 point complex buffer, of which the imaginary points are all zero, the first half of the real points are the even numbered points of the original, and the second half are the reversed odd-numbered points of the original buffer. This array function stores the variance (in dB) in scalar 55 and stores the mean divided by the variance in scalar 52. The re-ordered input is stored in buffer X2.

3.2.5.2.2 FFTN (FCB 204, PBFCB 168)

The FFTN array function is supplied by CSPI. As used in the Compute DCT Coefficients procedure, it performs a 256 complex-to-complex FFT not in place. To do so, it makes use of a cosine table (VSHRT) generated during initialization. The output is stored in buffer X2.

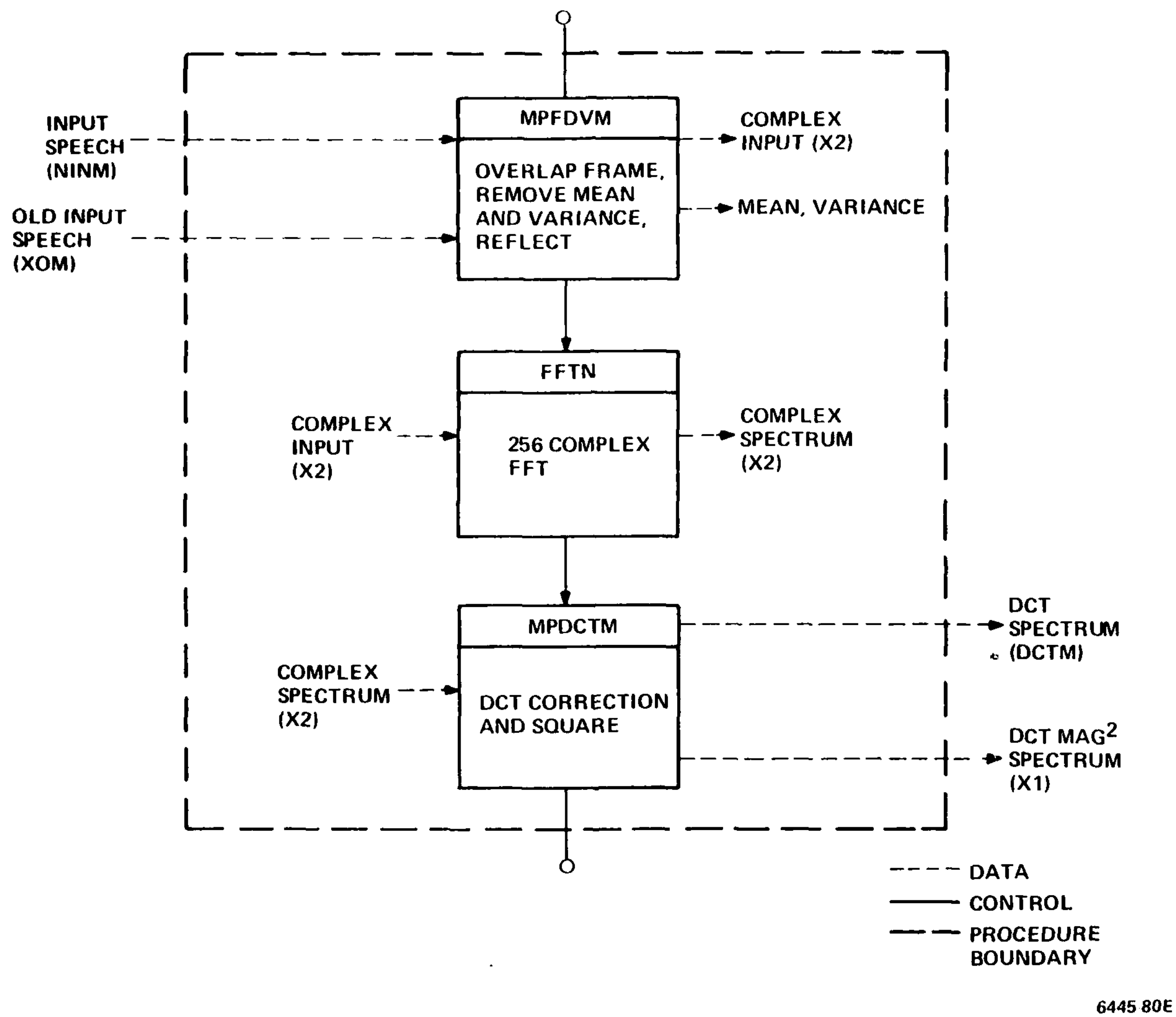


FIGURE 3-13: COMPUTE DCT COEFFICIENTS PROCEDURE

3.2.5.2.3 MPDCTM (FCB 241, PBFCB 154)

MPDCTM forms the 256 unique, real Discrete Cosine Transform coefficients from the 256 complex frequency samples generated by FFTN. It also forms the squared magnitudes of the DCT coefficients. These will be used later by the Compute and Quantize Sideband Parameters procedure for the calculation of an autocorrelation function.

The transformation from Complex Fourier coefficients is given by Makhoul[9]. Since the Fourier coefficients result from the FFT of a real sequence, they are conjugate symmetric and only the first half (128) of them need be used. These 128 Fourier coefficients are multiplied by one eighth of a cycle of a complex exponential. The real parts of the result form the first 128 DCT coefficients and the imaginary parts reversed form the negative of the remaining 128 DCT's. These 256 DCT coefficients are stored in buffer DCTM. The squares of the DCT's are also formed and are used to generate the real parts of 256 complex samples, which are used later. The imaginary parts of these 256 samples are zeroed. These 256 complex samples are then reflected to form a 512 point conjugate symmetric spectrum. The magnitude-squared spectrum is stored in buffer X2.

3.2.5.3 Compute and Quantize Sideband Parameters Procedure

This procedure consists of three array functions, as shown in Figure 3-14: FFTIN, MPMWGX, and MPQDPP. Its function is to compute the LPC spectrum and the pitch which are later used to form the bit allocation basis spectrum.

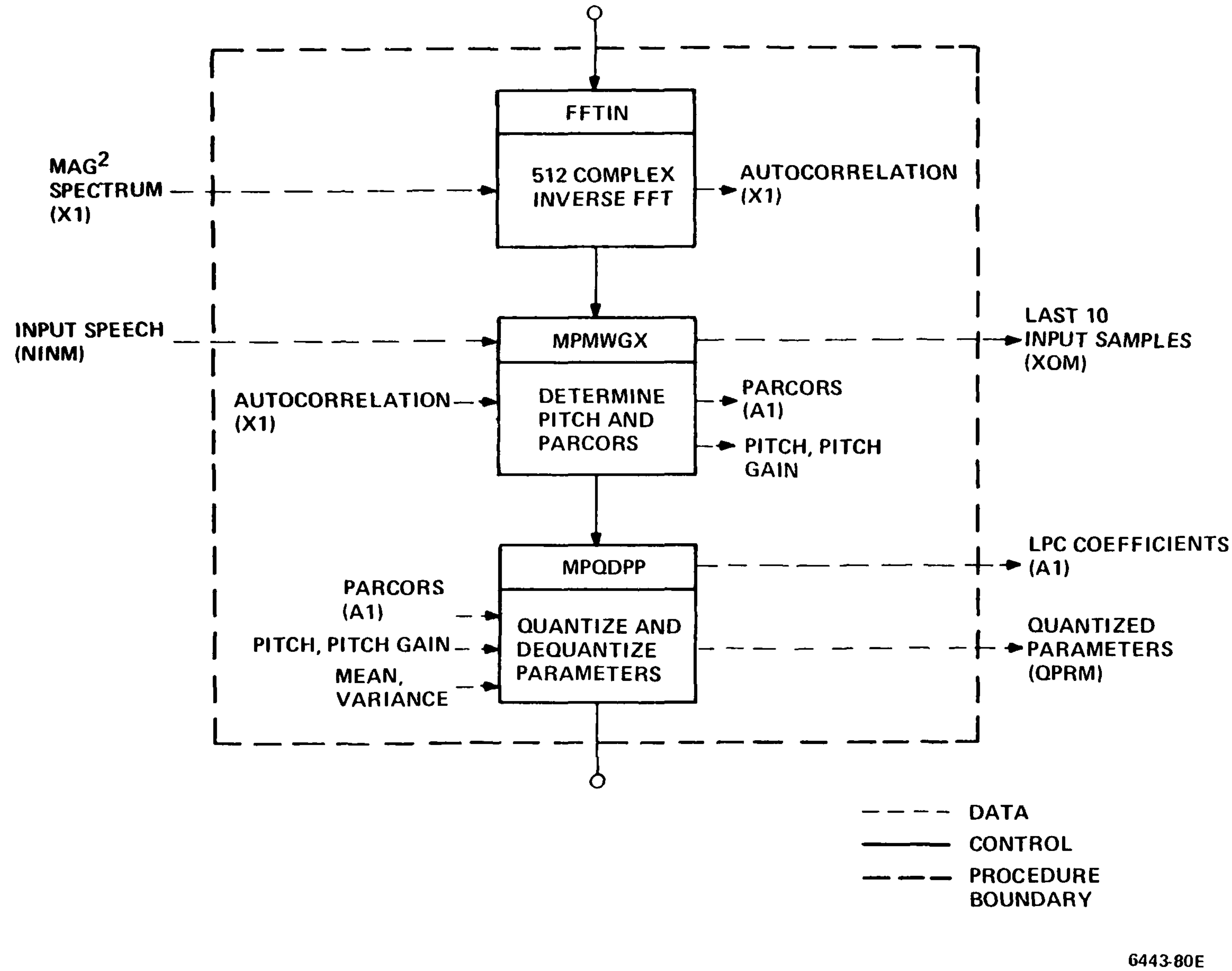


FIGURE 3-14: COMPUTE AND QUANTIZE SIDEBAND PARAMETERS PROCEDURE

3.2.5.3.1 FFTIN (FCB 206, PBFCB 169)

FFTIN is a CSPI supplied array function that performs an inverse Fast Fourier Transform, not in place. As used in Sideband Parameter procedure, it performs a 512 point complex transformation. Since the input to this function is a symmetric magnitude spectrum, the result is an autocorrelation function consisting of 256 unique real points.

3.2.5.3.2 MPMWGX (FCB 244, PBFCB 155)

The MPMWGX function determines 8 parcor coefficients and an estimate of the pitch and pitch gain from the autocorrelation input. In addition, it also copies the last 10 samples from the current input buffer to an area in the front of the input buffer. These samples will form the first 10 samples of the next frame.

The parcor coefficients are found using the Weiner-Levinson-Durbin algorithm as implemented by CSPI in the MWLD array function.

The pitch is estimated by finding the maximum autocorrelation value that lies between sample indices 15 and 94. The position of the maximum is used as the pitch period M, and the ratio of the maximum value to the zeroth autocorrelation is used as the pitch gain. The pitch is stored as a floating point number in scalar 61, and the pitch gain is stored in scalar 62.

3.2.5.3.3 MPQDPP (FCB 243, PBFCB 156)

This array function quantizes the 8 parcors determined earlier, as well as the mean, variance, pitch, and pitch gain. It also computes the associated dequantized values, in order that the basis spectrum generated from them later will be the same as that found by the receiver, assuming

no uncorrectable channel errors. The quantization/dequantization tables used are shown in Table 3-5.

Once the parcors have been quantized and dequantized, they are used to find the corresponding Linear Prediction (LPC) coefficients. The following recursion is used to find the first through eighth LPC coefficients:

$$A_m(m) = -P(m)$$

$$A_m(L) = A_{m-1}(L) - P_m * A_{m-1}(M-L) \qquad 1 \leq m \leq 8$$

$$1 \leq L < m$$

where $A_i(j)$ is the jth LPC coefficient during the ith iteration and P(j) is the jth parcor coefficient. These LPC coefficients are used later in the Compute Basis Spectrum procedure. The residual energy of the LPC coefficients is also computed and stored as ENG in scalar 60.

The quantized, coded parameters are collected in buffer QPRM with the parcor coefficients first, followed by the mean, variance, pitch, and pitch gain.

3.2.5.4 Determine Basis Spectrum Procedure

This procedure, shown in Figure 3-15 computes the basis spectrum from the quantized pitch value and the LPC coefficients. It consists of three array functions: MPFSTV, FF2R, and MPBASP.

3.2.5.4.1 MPFSTV (FCB 245, PBFCB 157)

This array function forms two time-domain functions, one from the quantized pitch and one from the LPC coefficients, and stores them as real and imaginary parts of a complex buffer. The time domain function

Parameter	Threshold	Code	Dequantized Value	Parameter	Threshold	Code	Dequantized Value
PARCOR 1		31	1.997	PARCOR 2		31	0.087
	1.933				1.962		
		30	1.869			30	0.263
	1.789				1.926		
		29	1.703			29	0.369
	1.644				1.896		
		28	1.581			28	0.462
	1.541				1.867		
		27	1.502			27	0.556
	1.444				1.836		
		26	1.385			26	0.624
	1.343				10804		
		25	1.300			25	0.681
	1.240				1.768		
		24	1.181			24	0.736
	1.122				1.732		
		23	1.063			23	1.714
	1.019				1.695		
		22	0.975			22	1.676
	0.930				1.653		
		21	0.885			21	1.630
	0.843				1.602		
		20	0.802			20	1.574
	0.771				1.547		
		19	0.740			19	1.520
	0.696				1.492		
		18	0.652			18	1.464
	0.615				1.436		
		17	0.577			17	1.407
	0.543				1.373		
		16	0.509			16	1.338
	0.477				1.306		
		15	0.445			15	1.274
	0.418				1.238		
		14	0.392			14	1.203
	0.368				1.162		
		13	0.344			13	1.121
	0.324				1.085		
		12	0.304			12	1.048
	0.286				1.012		
		11	0.268			11	0.977
	0.251				0.942		
		10	0.235			10	0.907
	0.219				0.876		
		9	0.204			9	0.846
	0.190				0.819		
		8	0.176			8	0.792
	0.162				0.764		
		7	0.150			7	0.736
	0.137				0.709		
		6	0.124			6	0.681
	0.112				0.653		
		5	0.100			5	0.624
	0.090				0.590		
		4	0.080			4	0.556
	0.070				0.509		
		3	0.060			3	0.462
	0.051				0.415		
		2	0.042			2	0.369
	0.033				0.316		
		1	0.025			1	0.263
	0.014				0.175		
		0	0.008			0	0.087

TABLE 3-5: PARAMETER QUANTIZATION AND DEQUANTIZATION TABLE

Parameter	Threshold	Code	Dequantized Value	Parameter	Threshold	Code	Dequantized Value
PARCOR 3		15	1.844	PARCOR 4		15	1.950
	1.750				1.882		
		14	1.655			14	1.183
	1.585				1.754		
		13	1.516			13	1.695
	1.462				1.642		
		12	1.408			12	1.589
	1.358				1.539		
		11	1.309			11	1.489
	1.261				1.441		
		10	1.213			10	1.393
	1.168				1.346		
		9	1.123			9	1.300
	1.080				1.255		
		8	1.037			8	1.209
	0.995				1.165		
		7	0.953			7	1.121
	0.911				1.076		
		6	0.870			6	1.032
	0.829				0.988		
		5	0.787			5	0.943
	0.745				0.897		
		4	0.703			4	0.851
	0.658				0.801		
		3	0.613			3	0.752
	0.562				0.696		
		2	0.512			2	0.640
	0.452				0.572		
		1	0.392			1	0.504
	0.315				0.409		
		0	0.238			0	0.314

TABLE 3-5: PARAMETER QUANTIZATION AND DEQUANTIZATION TABLE (CONT'D)

Parameter	Threshold	Code	Dequantized Value	Parameter	Threshold	Code	Dequantized Value
PARCOR 5		7	1.591	PARCOR 6		7	1.621
	1.482				1.509		
		6	1.374			6	1.398
	1.297				1.319		
		5	1.219			5	1.240
	1.153				1.173		
		4	1.086			4	1.105
	1.022				1.041		
		3	0.958			3	0.976
	0.891				0.909.		
		2	0.825			2	0.842
	0.747				0.763		
		1	0.669			1	0.685
	0.557				0.573		
		0	0.445			0	0.462
PARCOR 7		3	1.320	PARCOR 8		3	1.382
	1.167				1.243		
		2	1.013			2	1.105
	0.875				0.985		
		1	0.736			1	0.865
	0.568				0.722		
		0	0.397			0	0.879

Mean		
2.854	15	3.132
2.394	14	2.576
2.072	13	2.212
1.816	12	1.932
1.598	11	1.699
1.403	10	1.496
1.231	9	1.314
1.070	8	1.148
	7	0.992
	6	0.846
	5	0.706
	4	0.572
	3	0.441
	2	0.313
	1	0.187
	0	0.062

Pitchgain		
0.824	3	0.898
0.667	2	0.750
0.488	1	0.584
	0	0.392

Variance		
59.760	31	60.709
58.016	30	58.810
56.491	29	57.223
55.072	28	55.758
53.709	27	54.385
52.334	26	53.034
50.900	25	51.633
49.431	24	50.167
47.960	23	48.695
46.483	22	47.224
44.982	21	45.741
43.443	20	44.222
41.864	19	42.664
40.204	18	41.065
38.386	17	39.343
36.477	16	37.430
34.633	15	35.525
32.888	14	33.741
31.179	13	32.035
29.409	12	30.322
27.476	11	28.495
25.415	10	26.458
23.405	9	24.372
21.426	8	22.439
19.276	7	20.412
16.994	6	18.140
14.548	5	15.849
12.05[illegible]	4	13.242
9.831	3	10.868
7.798	2	8.794
5.631	1	6.802
	0	4.460

Pitch (M)	Code	Decoded Pitch	Pitch	Code	Decoded Pitch	Pitch	Code	Decoded Pitch
0	0	15	32	17	32	64	48	63
1	0	15	33	18	33	65	49	65
2	0	15	34	19	34	66	49	65
3	0	15	35	20	35	67	50	67
4	0	15	36	21	36	68	50	67
5	0	15	37	22	37	69	51	69
6	0	15	38	23	38	70	51	69
7	0	15	39	24	39	71	52	71
8	0	15	40	25	40	72	52	71
9	0	15	41	26	41	73	53	73
10	0	15	42	27	42	74	53	73
11	0	15	43	28	43	75	54	75
12	0	15	44	29	44	76	54	75
13	0	15	45	30	45	77	55	77
14	0	15	46	31	46	78	55	77
15	0	15	47	32	47	79	56	79
16	1	16	48	33	48	80	56	79
17	2	17	49	34	49	81	57	81
18	3	18	50	35	50	82	57	81
19	4	19	51	36	51	38	58	83
20	5	20	52	37	52	48	58	83
21	6	21	53	38	53	85	59	85
22	7	22	54	39	54	86	59	85
23	8	23	55	40	55	87	60	87
24	9	24	56	41	56	88	60	87
25	10	25	57	42	57	89	61	89
26	11	26	58	43	58	90	16	89
27	12	27	59	44	59	91	62	91
28	13	28	60	45	60	92	62	91
29	14	29	61	46	61	93	63	93
30	15	30	62	47	62	94	63	93
31	16	31	63	48	63			

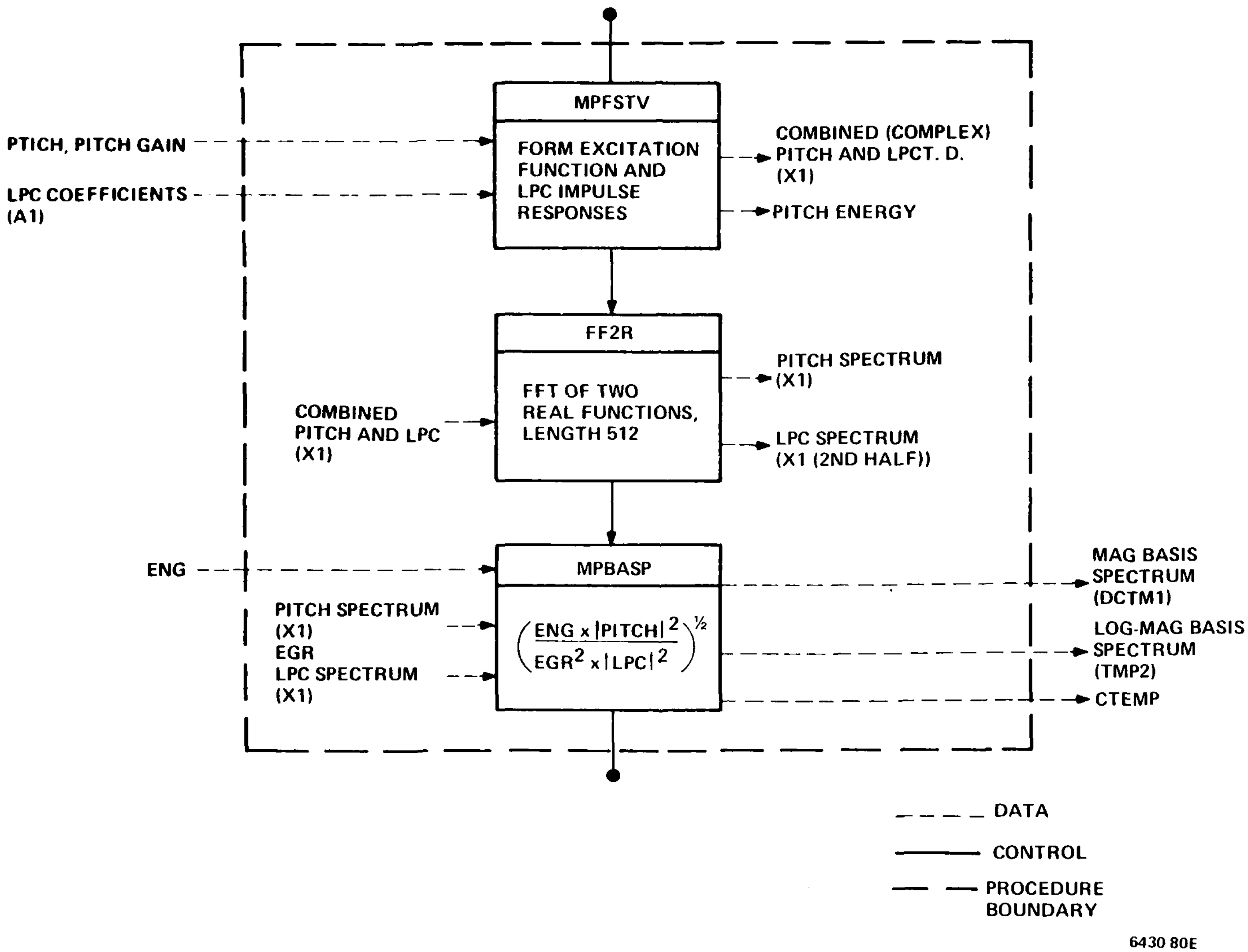


FIGURE 3-15: BASIS SPECTRUM DETERMINATION PROCEDURE

formed from the pitch represents the excitation function. It is an exponentially decaying pulse train with a period equal to the pitch and contains zeroes except at multiples of the pitch period. The values at the pulse points are the positive powers of the pitch gain. That is:

$$XR(K*M) = PG^{K+1} \qquad \text{for } 0 \leq K*M < 256$$

where M is the pitch period, PG the pitch gain, and XR is the output. The excitation is stored in the real part of the 512 point complex output buffer. The sum of the pitch pulses is accumulated and stored in scalar 73.

The other time domain function is the vocal tract filter function. It is formed from the impulse response of the LPC filter, which is simply 1, -A(1), -A(2), ... -A(8). The remaining 503 imaginary values are zeroed.

The two time domain functions, though both real, are stored in a complex buffer to facilitate the use of an efficient FFT algorithm, FF2R.

3.2.5.4.2 FF2R (FCB 214, PBFCB 170)

FF2R is a CSPI supplied array function used to transform two real signals simultaneously. One input function is stored in the real part of a complex buffer, and its transform appears in the first half of the complex buffer output. Similarly, the second function is stored in the imaginary parts of the input buffer, and its transform appears in the second half of the output buffer. As used in the ATC system, FF2R uses 512 point complex buffers as input and output. The output buffer is divided in half into two 256 point complex buffers. The first contains

the frequency spectrum of the pitch excitation function. The second contains the frequency response of the vocal tract inverse filter.

3.2.5.4.3 MPBASP (FCB 253, PBFCB 158)

MPBASP forms the magnitude basis spectrum from the frequency spectrum and the inverse filter response. It also forms the base 2 logarithm of this basis spectrum to be used later in bit allocation.

This routine first calculates the magnitude squared of the basis spectrum by the following formula:

$$|BASIS|^2 = \frac{ENG * |Pitch|^2}{EGR^2 * |Inverse\ Filter|^2}$$

where ENG is the residual energy of the LPC spectrum as calculated in MPQDPP and stored in scalar 60, and EGR is the sum of the excitation pulses as determined by MPFSTV and stored in scalar 73. Then one half the base 2 logarithm of the result is calculated. This is equivalent to the base 2 log-magnitude basis spectrum. For reasons of efficiency, the single MAP instructions LGS and RCP, which approximate the base 16 log and the reciprocal, are used. The DC component of the log magnitude basis spectrum is forced to be very small.

The magnitude basis spectrum is found as follows:

$$|BASIS| = 2^{\left(\frac{\log|Basis|^2}{2}\right)}$$

This exponentiation is performed using the same technique as the CSPI supplied array function VEXP. This approach was found to be faster than finding the square root directly.

The log base 2 magnitude basis spectrum output is stored in buffer TMP2 (256 real points). The magnitude basis spectrum output is stored in buffer DCTM1 (also 256 real points). Also, scalar 73, EGR, is modified to become 1.0/EGR. Finally, the sum of the log magnitudes is subtracted from the number of bits to be allocated, the difference is divided by 256, and the resultant average bit allocation is stored in CTEMP, scalar 80.

3.2.5.5 Bit Allocation Procedure

The bit allocation procedure determines how many bits are to be used to code each DCT coefficient for transmission under four constraints. The four constraints are: 1) each DCT must be coded with an integral number of bits; 2) that the sum of the bits allocated to the DCT coefficients must equal 267; 3) that the maximum number of bits allocated to any DCT coefficient is three; and 4) that the numbers of bits allocated to the DCT coefficients approximate the log-magnitude basis spectrum.

Satisfying these constraints exactly is a difficult, time consuming task. An approximate solution is found by reordering to log magnitude basis spectrum coefficients (and the corresponding DCT coefficients and magnitude spectrum coefficients) by size. The bit allocation for the reordered DCT coefficients will then be monotonically decreasing. Monotonically decreasing bit allocations are useful for horizontal encoding and protection.

The bit allocation procedure consists of three array functions, as shown in Figure 3-16. They are MPASRT, which performs the reordering, MPSCAN, which determines the preliminary bit allocation, and MPCDBA, which performs a correction on the preliminary bit allocation to produce a final bit allocation.

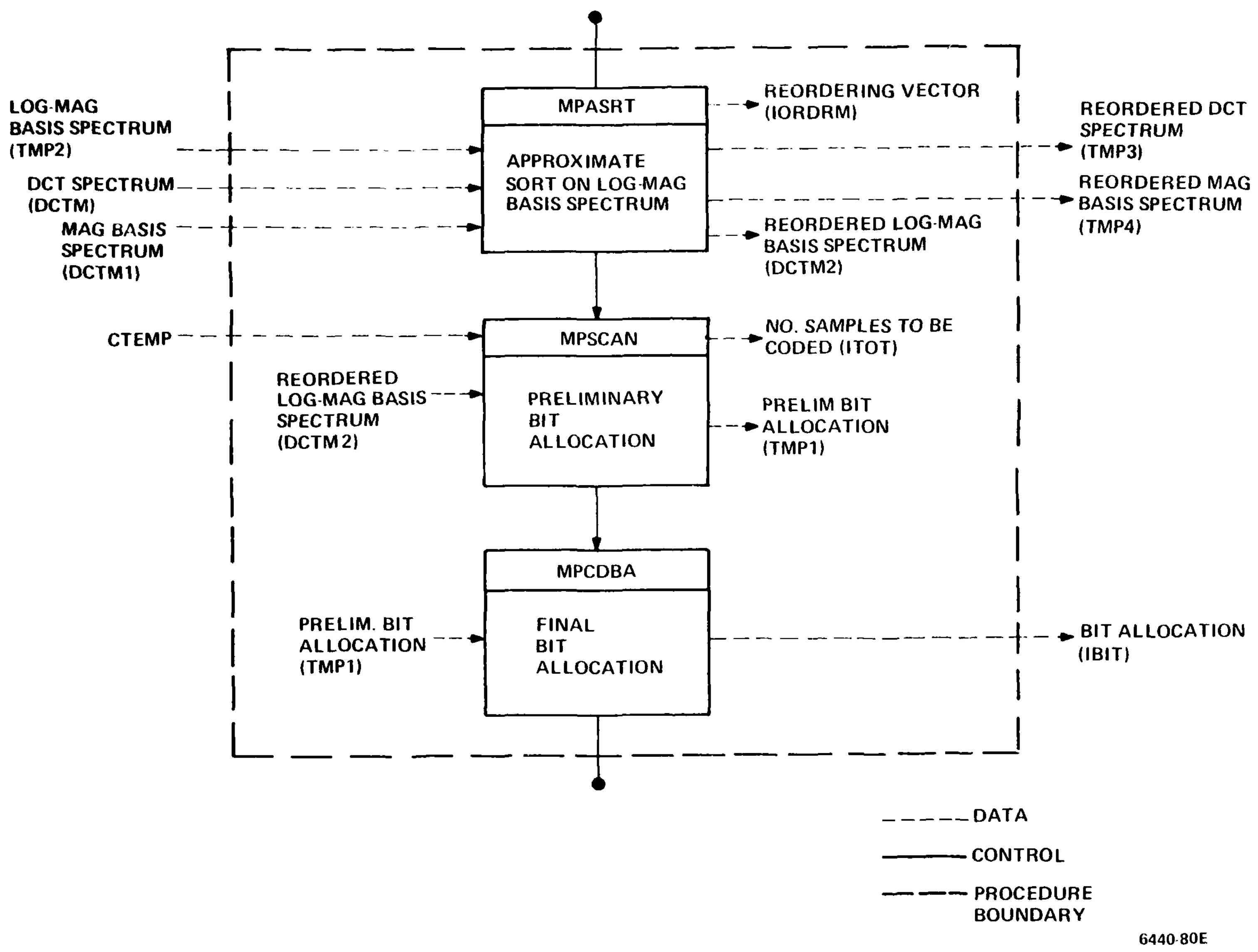


FIGURE 3-16: BIT ALLOCATION PROCEDURE

3.2.5.5.1 MPASRT (FCB 249, PBFCB 159)

This array function performs an approximate sort on the log-magnitude basis spectrum coefficients in buffer TMP2. It determines a vector of indices expressing the sorted order, and reorders the DCT coefficients (in buffer DCTM) and the magnitude basis spectrum coefficients (in DCTM1) accordingly.

The sort is performed by assigning each log-magnitude basis spectrum coefficient to one of four bins, depending on size. The index, the position in the buffer of each coefficient, is added to an ordering list corresponding to the bin. The thresholds for the four bins are shown in Table 3-6. When all indices have been added to one of the four lists, the lists are concatenated to form a complete ordering vector in buffer IORDR.

Once IORDR has been obtained, the three input buffers DCTM, (DCT coefficients), DCTM1 (magnitude basis spectrum), and TMP2 (log-magnitude basis spectrum) are reordered by using IORDR as indirect addresses into each of the input buffers and forming sequential outputs. That is,

$$\mathrm{OUTPUT}(I) = \mathrm{INPUT}\Big(\mathrm{IORDRM}(I)\Big)$$

The three output buffers are TMP3, TMP4, and DCTM2, respectively.

The required indirect addressing is achieved by performing a "scatter write" into APS program memory to modify the addresses used in the input instructions.

3.2.5.5.2 MPSCAN (FCB 254, PBFCB 160)

This array function proceeds in two passes to form a preliminary bit allocation. The first calculates a new log magnitude spectrum whose

Bin #	Threshold
3	
	2.907
2	
	1.322
1	
	-0.488
0	

TABLE 3-6: BIT ALLOCATION THRESHOLDS

mean is equal to the average number of bits per sample to be allocated. It also determines the last sample of this new spectrum to be coded. That is, the samples which follow will be allocated zero bits. It also keeps a running sum of the samples of the new spectrum to be coded.

The second pass generates another log magnitude spectrum whose mean is the average number of bits available per sample to be coded and whose trailing samples are zero. The coefficients of this spectrum are then rounded and fixed to form the preliminary bit allocation.

Inputs to MPSCAN are buffer DCTM2, the log-magnitude basis spectrum, and CTEMP, the average bit offset to be applied in pass 1, computed in MPBASP and stored in scalar 80. The output is stored as floating point numbers in buffer TMP1. In addition, ITOT, the number of samples to be coded, is stored in scalar 83.

3.2.5.5.3 MPCDBA (FCB 255, PBFCB 161)

This array function consists of at least four passes. The first pass forces the preliminary bit allocations to be monotonically decreasing and sums them. If this sum ever exceeds the available number of bits, BTLTH = 267, the remaining bit allocations in the input buffer are zeroed. The second pass clips the bit allocations at 3, and updates the total bits allocated sum accordingly. Pass 3 allocates the leftover bits, beginning at the front of the buffer, but never raising the bit allocation of any coefficient over 3.0. If some bits remain to be allocated at the end of this pass, the pass is repeated. Finally, the bit allocations are changed from floating point integers to fixed point numbers and stored.

The input to MPCDBA is buffer TMP1, the preliminary bit assignment. The output is stored in IBIT.

3.2.5.6 DCT Coefficient Quantization Procedure (FCB 250, RBFCB 162)

This procedure, shown in Figure 3-17, consists of one array function, MPFSTQ. From the bit allocations in IBIT, this array function determines the number of quantization levels and the associated thresholds for each (reordered) DCT coefficient. The thresholds are multiplied by the corresponding magnitude basis spectrum value and then used to quantize and code the DCT coefficients into code words of various lengths. The thresholds, quantization levels, and resultant code words are shown in Table 3-7.

The inputs to MPFSTQ are IBIT; TMP3, the reordered DCT coefficients; and TMP4, the reordered magnitude basis spectrum. The output of MPFSTQ is stored as fixed point numbers in buffer QTDCTM.

3.2.6 Synthesize Process

The Synthesize process performs the Adaptive Transform Decoding algo rithm to obtain digital speech waveforms. The input to this process is coded, quantized sideband parameters and coded, quantized DCT coefficients.

The Synthesize process is composed of seven functional procedures: Cycle Delay Lines, Dequantize Sideband Parameters, Basis Spectrum Determination, Bit Allocation, Copy Temporary Buffers, DCT Coefficients Dequantization, and Inverse DCT Computation. The relationships between these procedures are shown in Figure 3-18. Each procedure consists of one or more array functions. The entire Synthesize process runs in the Arithmetic Processor portion of the MAP.

Code	3 Bit Threshold	2 Bit Threshold	1 Bit Threshold
3			
	2.3796	-	-
2			
	1.2327	-	-
1			
	0.5332	1.1269	-
0			
	0	0	0

Note: Negative values are quantized similarly,
sign bit of code is set

TABLE 3-7: DCT COEFFICIENT QUANTIZATION

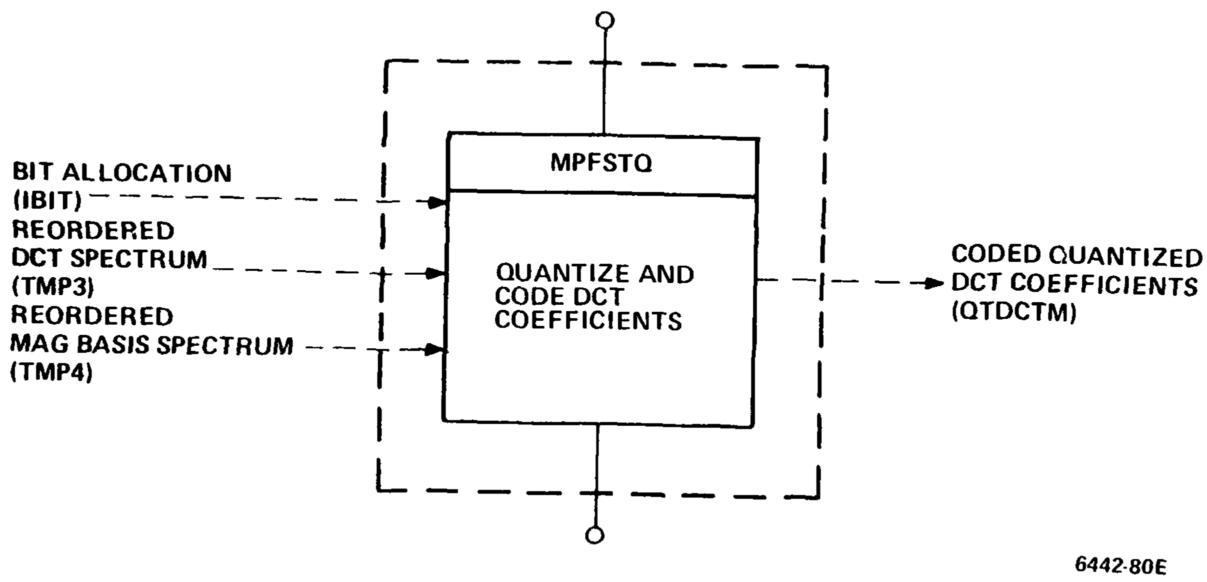


FIGURE 3-17: DCT QUANTIZATION PROCEDURE

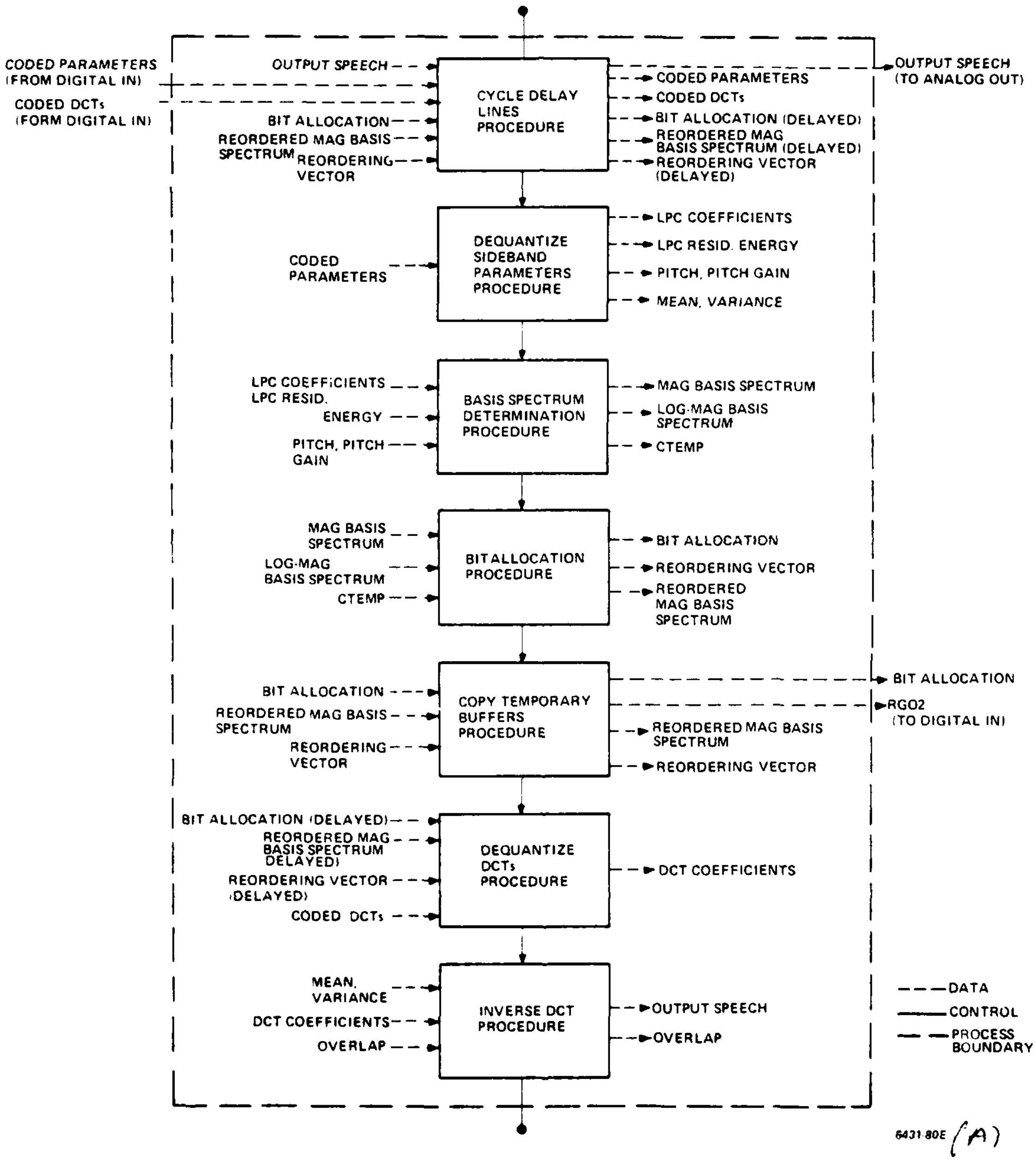


FIGURE 3-18: SYNTHESIZE PROCESS

3.2.6.1 Cycle Delay Lines Procedure (FCB 238, PBFCB 173)

The Cycle Delay Lines procedure consists of a single array function, VMOV2. It provides data to the Analog Out process and accepts data from the Digital In process, enables the Receive background program, and provides a single frame delay. This procedure is shown in Figure 3-19.

Output speech data from the previous instance of the Synthesize process is stored in buffer NOUT. VMOV2 copies this data to buffer OUTB, which will be used by the Analog Out process. VMOV2 sets the flag OUTFUL (integer scalar 111) to indicate that new data is present, thus enabling the A/D background program.

Similarly, VMOV2 copies data from two buffers, ARQPB and ARQDCT. These buffers have been filled by the Receive background program and contain the de-serialized sideband parameters and DCT coefficients. VMOV2 copies these buffers into QPRM and QRDCTM and sets flag RGO to indicate that the input buffers are empty, enabling the Receive background program to execute and fill them again.

The input sideband parameters in QPRM do not represent the same frame of speech as the DCT coefficients in QRDCTM. Because the bit allocation, which is derived from the sideband parameters, must be obtained before the DCT coefficients can be deserialized, the transmitted DCT coefficients lag the transmitted sideband parameters by one frame. This means that the bit allocation, basis spectrum, and reordering vector determined in one instance of the Synthesize processs must be saved to be used in the next instance of the process. VMOV2 implements this delay, as shown in Figure 3-20. The bit allocation, basis spectrum, and reordering vector have been stored in buffers MIBIT1, DCTIT1, and IORDR1, by the

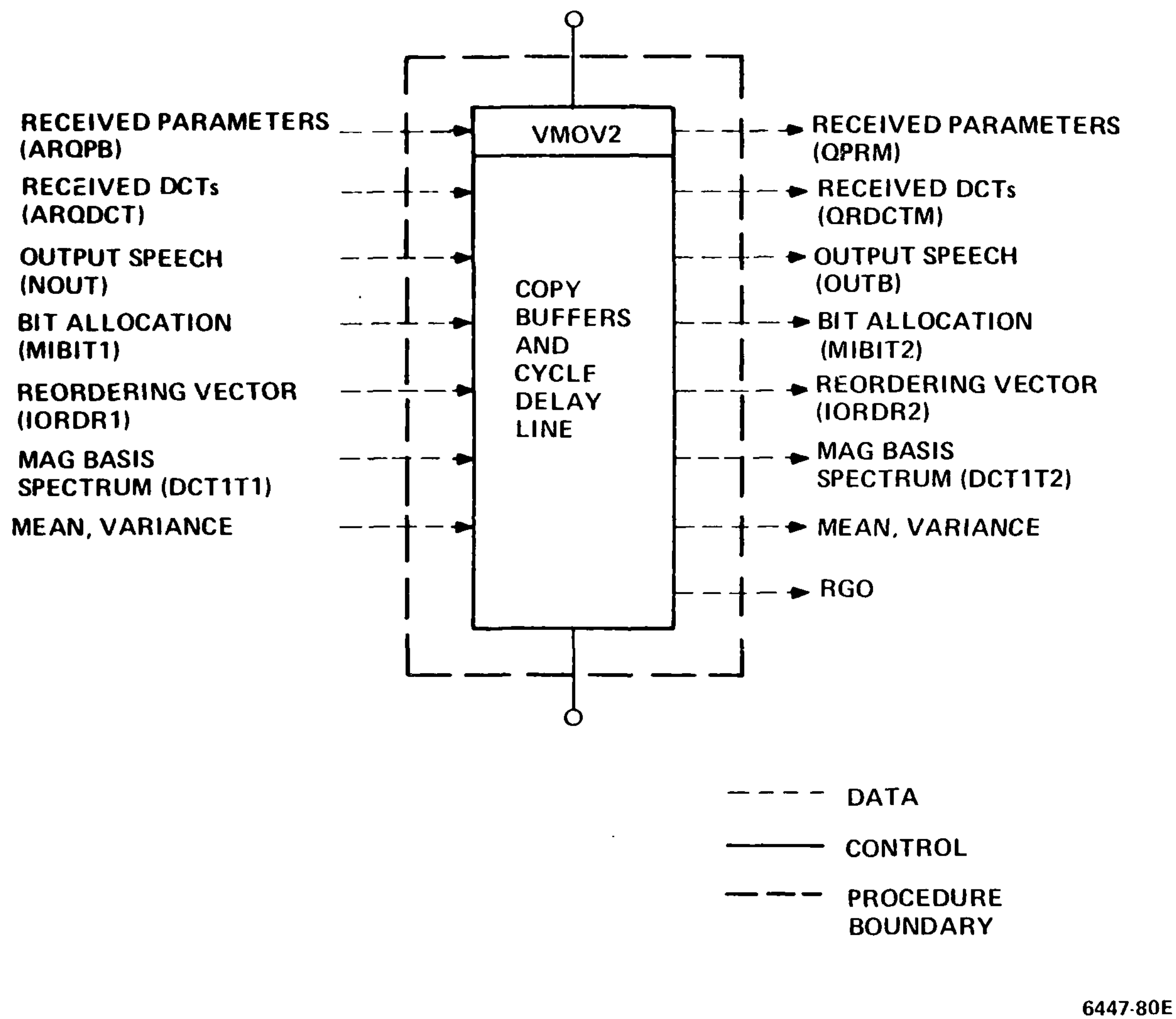


FIGURE 3-19: CYCLE DELAY LINES PROCEDURE (SYNTHESIZE)

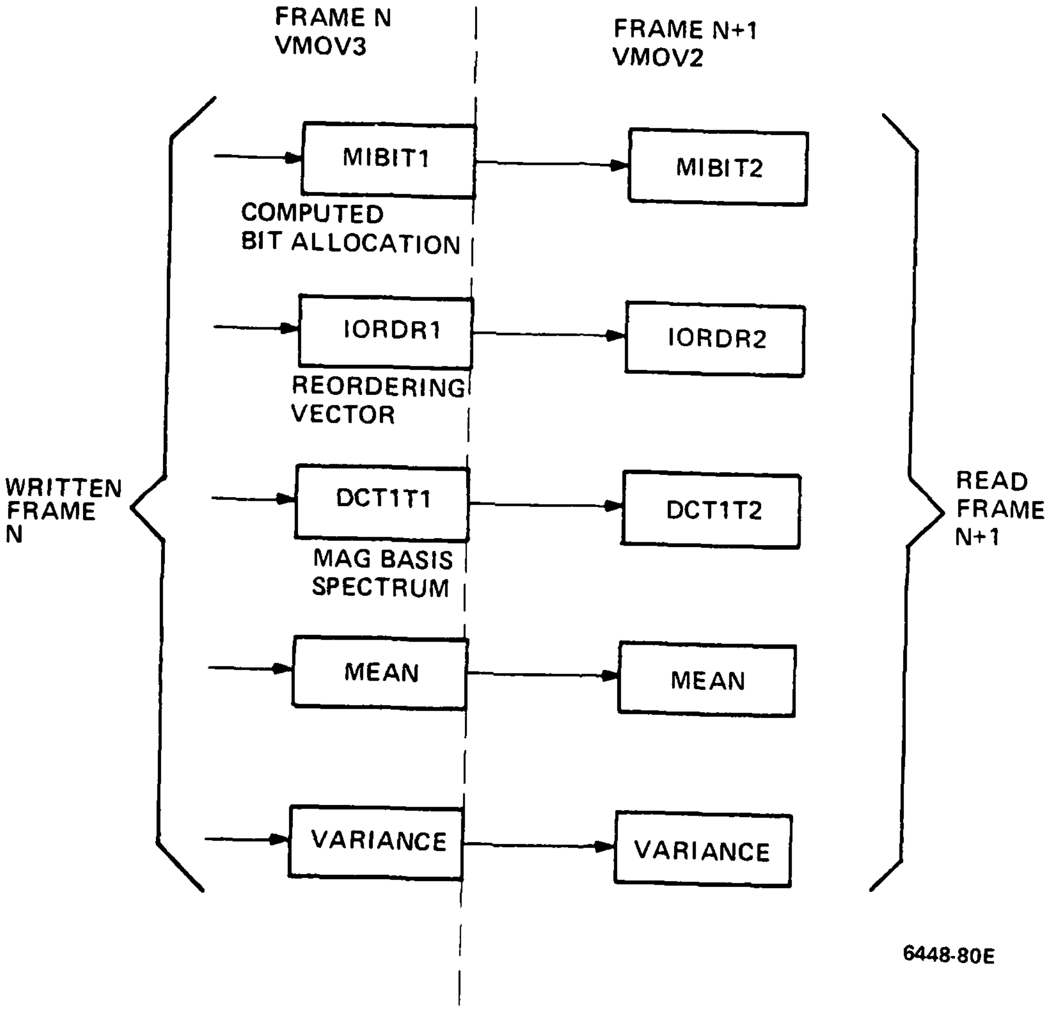


FIGURE 3-20: SYNTHESIZE DELAY LINES

previous instance of the process, and are moved by VMOV2 to MIBIT2, DCT1T2, and IORDR2, from which they will be used in the DCT dequantization procedure. The mean and variance have been stored in scalars 102 and 103 and are moved to scalars 100 and 101 to implement a similar frame delay on these parameters.

3.2.6.2 Sideband Parameter Dequantization Procedure (FCB 244, PBFCB 163)

This procedure, shown in Figure 3-21, consists of a single array function, MPDQPP. MPDQPP decodes 12 sideband parameters: 8 parcor coefficients, pitch, pitch gain, mean, and variance using the same tables used by MPQDPP (subsection 3.2.5.3.3). The input parameters are fixed point integers and are contained in buffer QPRM. These integers are used as indices into the appropriate decoding tables. The dequantized parcor coefficients are transformed to LPC coefficients as in MPQDPP, which are then output to buffer A1. The residual energy of the LPC coefficients (ENG) is stored in scalar 60. The dequantized pitch is output to scalar 91, the pitch gain to scalar 90, the variance to scalar 89, and the mean to scalar 88.

3.2.6.3 Basis Spectrum Determination Procedure

This procedure is identical to the Basis Spectrum Determination performed in the Analyze process (subsection 3.2.5.4, Figure 3-15). This procedure uses MPFSTV, FF2R, and MPBASP to determine the log-magnitude basis spectrum, stored in TMP2, and the magnitude basis spectrum, stored in DCTM1. If there are no uncorrectable transmission errors, these spectra will be identical to those determined in the Analyze process.

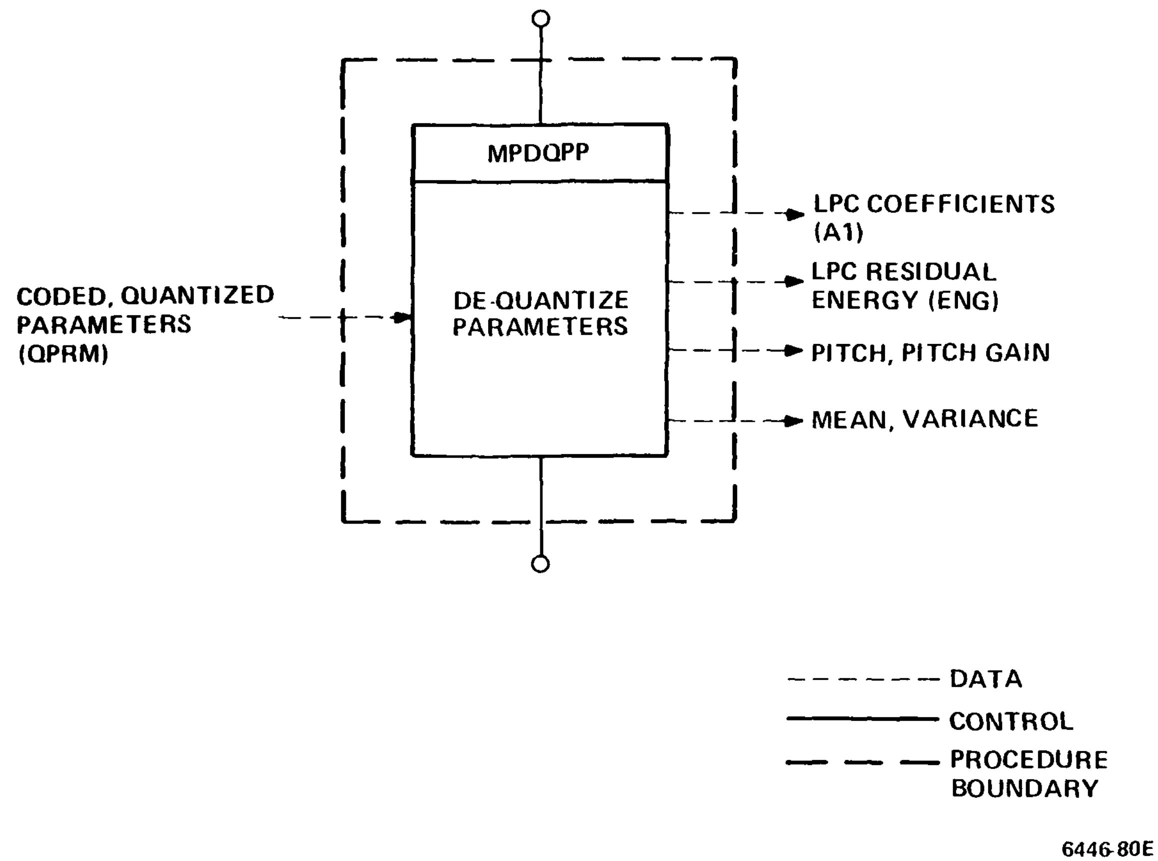


FIGURE 3-21: PARAMETER DEQUANTIZATION PROCEDURE

3.2.6.4 Bit Allocation Procedure

This procedure determines the number of bits used to code each of the DCT coefficients. It is very similar to the bit allocation procedure used in the Analyze process (subsection 3.2.5.5) except that the sorting function is slightly changed.

The bit allocation procedure in the Synthesize process also consists of three array functions: MPSSRT, MPSCAN, and MPCDBA. This procedure is shown in Figure 3-22.

3.2.6.4.1 MPSSRT (FCB 248, PBFCB 167)

This array function is similar to MPASRT (subsection 3.2.5.5.1) in that it reorders the magnitude and log-magnitude basis spectra contained in buffers DCT1 and TMP2, respectively, and stores the reordering information in a vector of indices, IORDRM. However, MPSSRT performs no reordering on the (coded) DCT coefficients. The coded DCT coefficients are transmitted in sorted order. They will be reordered to normal order in the dequantization procedure (subsection 3.2.6.6) later.

3.2.6.4.2 MPSCAN (FCB 254, PBFCB 160)

This is the same array function used in the Analyze process and described in subsection 3.2.5.5.2. It uses the same input and output buffers and is invoked using the identical prebound FCB.

3.2.6.4.3 MPCDBA (FCB 255, PBFCB 175)

This is the same array function used in the Analyze process and described in subsection 3.2.5.5.3. It is the identical FCB, but prebound differently. As used in the Synthesize process, it is prebound FCB

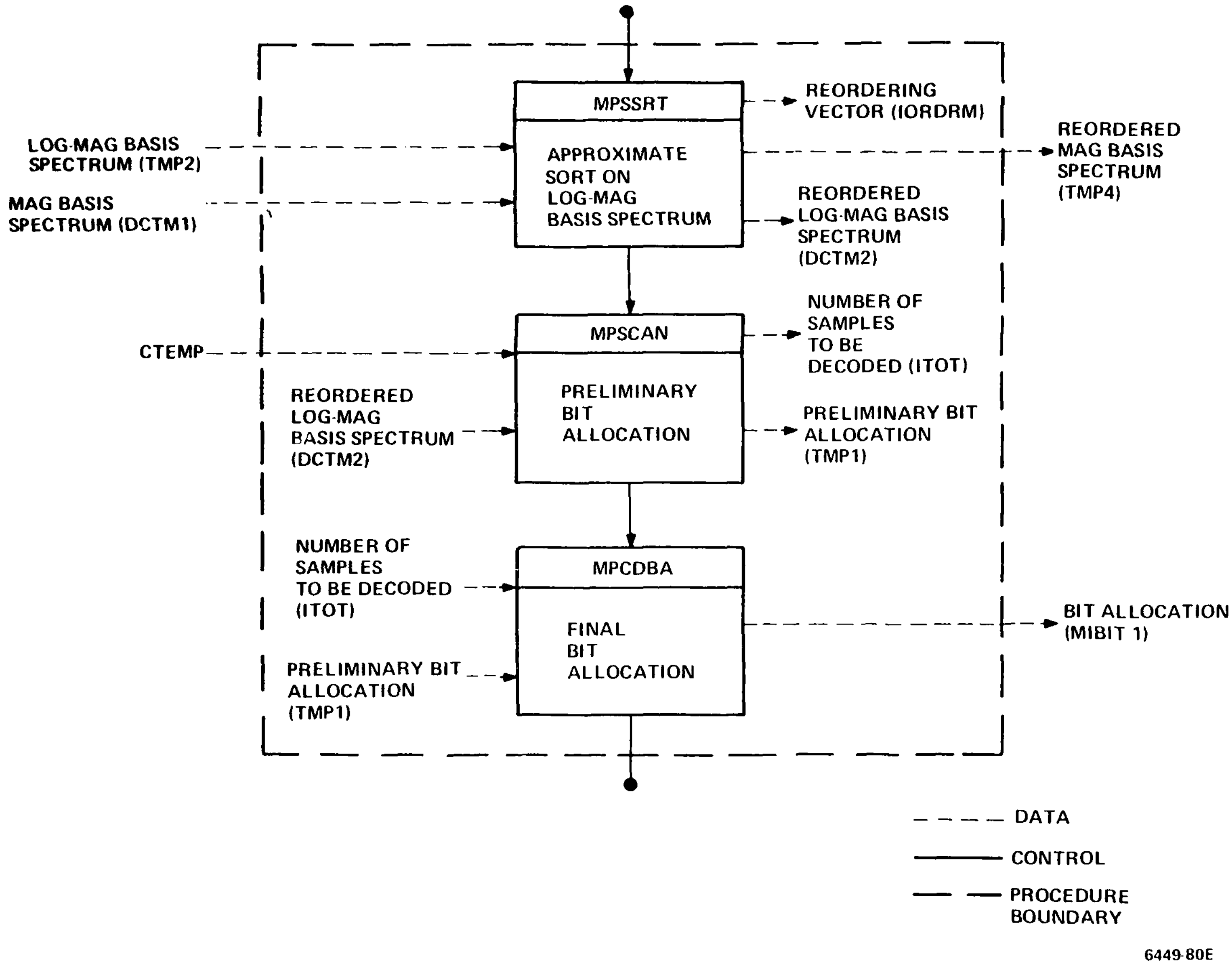


FIGURE 3-22: BIT ALLOCATION PROCEDURE (SYNTHESIZE)

175. The only difference made by this alternate prebinding is that the output buffer, which stores the bit allocations, is MIBIT1 instead of MIBIT2, as is used in the Analyze process.

3.2.6.5 Copy Temporary Buffers Procedure (FCB 240, PBFCB 174)

This procedure, shown in Figure 3-23, consists of a single array function, VMOV3. Its purpose is to copy data from temporary buffers, used to speed up computation, to permanent buffers, which will remain unmodified until the next instance of the Synthesize process. It also makes the DCT bit allocation information available to the Receive process and enables the Receive process to proceed by setting the flag RG02 (integer scalar 116).

VMOV3 copies buffer IORDRM, the reordering indices, into buffer IORDR1, which is the first stage of the Synthesize ordering delay line described in subsection 3.2.6.1. It also copies TMP4, the reordered magnitude basis spectrum, into DCT1T1, the first stage of the Synthesize basis spectrum delay line. Buffer MIBIT1, the first stage of the Synthesize bit allocation delay line, already contains the bit allocation information, as a result of MPCDBA. VMOV3 copies this information into buffer RIBIT, which will be used by the Receive process to deserialize the received DCT coefficients, and sets flag RG02 to enable the Receive process to proceed with this deserialization. VMOV3 also copies the dequantized mean and variance from scalars 88 and 89 to scalars 102 and 103.

3.2.6.6 DCT Coefficient Dequantization Procedure (FCB 252, PBFCB 164)

This procedure, shown in Figure 3-24, consists of a single array function, MPFSTD. MPFSTD uses each coded DCT coefficient (sorted order)

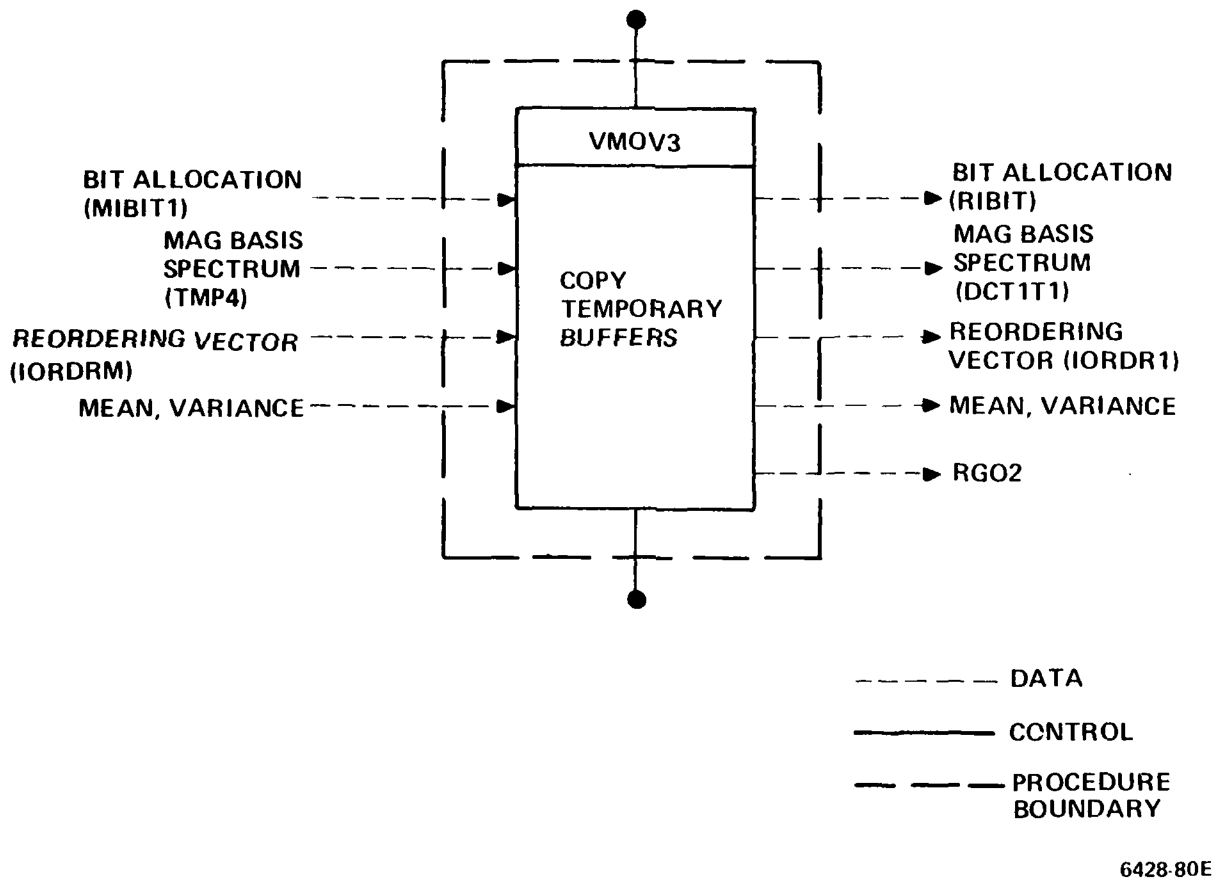


FIGURE 3-23: COPY TEMPORARY BUFFERS PROCEDURE

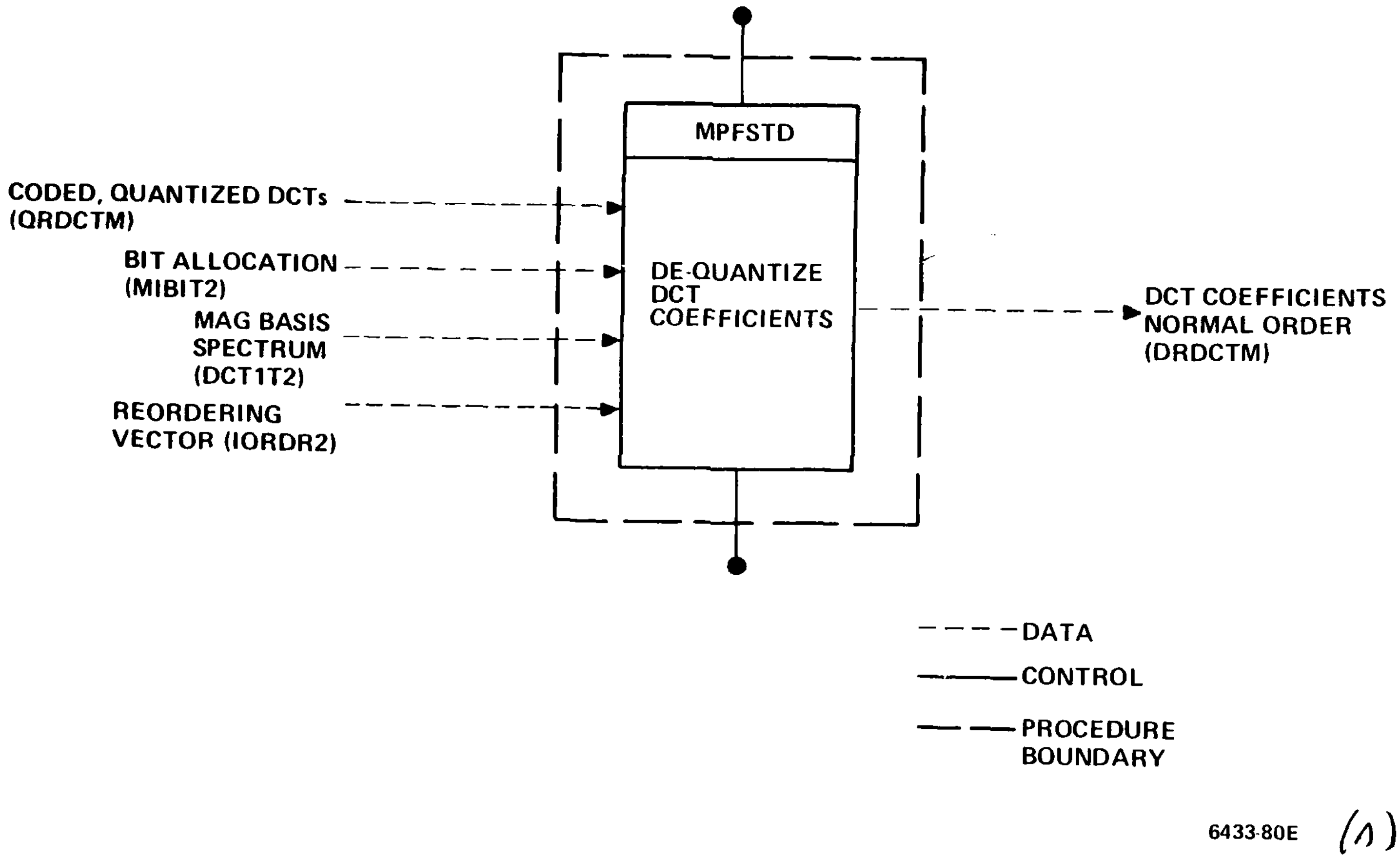


FIGURE 3-24: DCT DEQUANTIZATION PROCEDURE

from buffer QRDCTM as an index into a decoding table. The particular table used is determined from the bit allocation vector, MIBIT2. The value found from the decoding table is multiplied by the corresponding magnitude basis spectrum coefficient (DCT1T2). The resulting product is the dequantized DCT coefficient and is stored in buffer DRDCTM, using the reordering vector (ICRDR2) as the index into this output buffer so that the results will be in normal order. That is,

$$\text{DRDCTM}\Big(\text{IORDR2}(\text{I})\Big) = \text{Decode}\Big(\text{QRDCTM}(\text{I})\Big) \times \text{DCT1T2}(\text{I})$$

The decoding tables are given in Table 3-8.

3.2.6.7 Inverse DCT Procedure

This procedure, shown in Figure 3-25, consists of three array functions, MPIDCM, FFTIN, and MPVDNM. It transforms the dequantized DCT coefficients back to a time domain waveform, restores the variance and mean to this waveform, and overlaps it with the waveform obtained in the previous frame to generate the output speech waveform.

3.2.6.7.1 MPIDCM (FCB 249, PBFCB 165)

This array function performs the inverse of the correction applied by the Analyze process array function MPDCTM (subsection 3.2.5.2.3). It forms a conjugate symmetric spectrum to which an inverse FFT will later be applied from the dequantized DCT coefficients in buffer DRDCTM. The real and complex parts of the output buffer X2 (XR(K) and XI(K)), respectively, are formed as follows:

Code	3 Bit Value	2 Bit Value	1 Bit Value
7	-3.0867	-	-
6	-1.6725	-	-
5	-0.8330	-	-
4	-0.2334	-	-
3	3.0867	-1.8340	-
2	1.6725	-0.4196	-
1	0.8330	1.8340	-0.7071
0	0.2334	0.4196	0.7071

TABLE 3-8: DCT COEFFICIENT DEQUANTIZATION

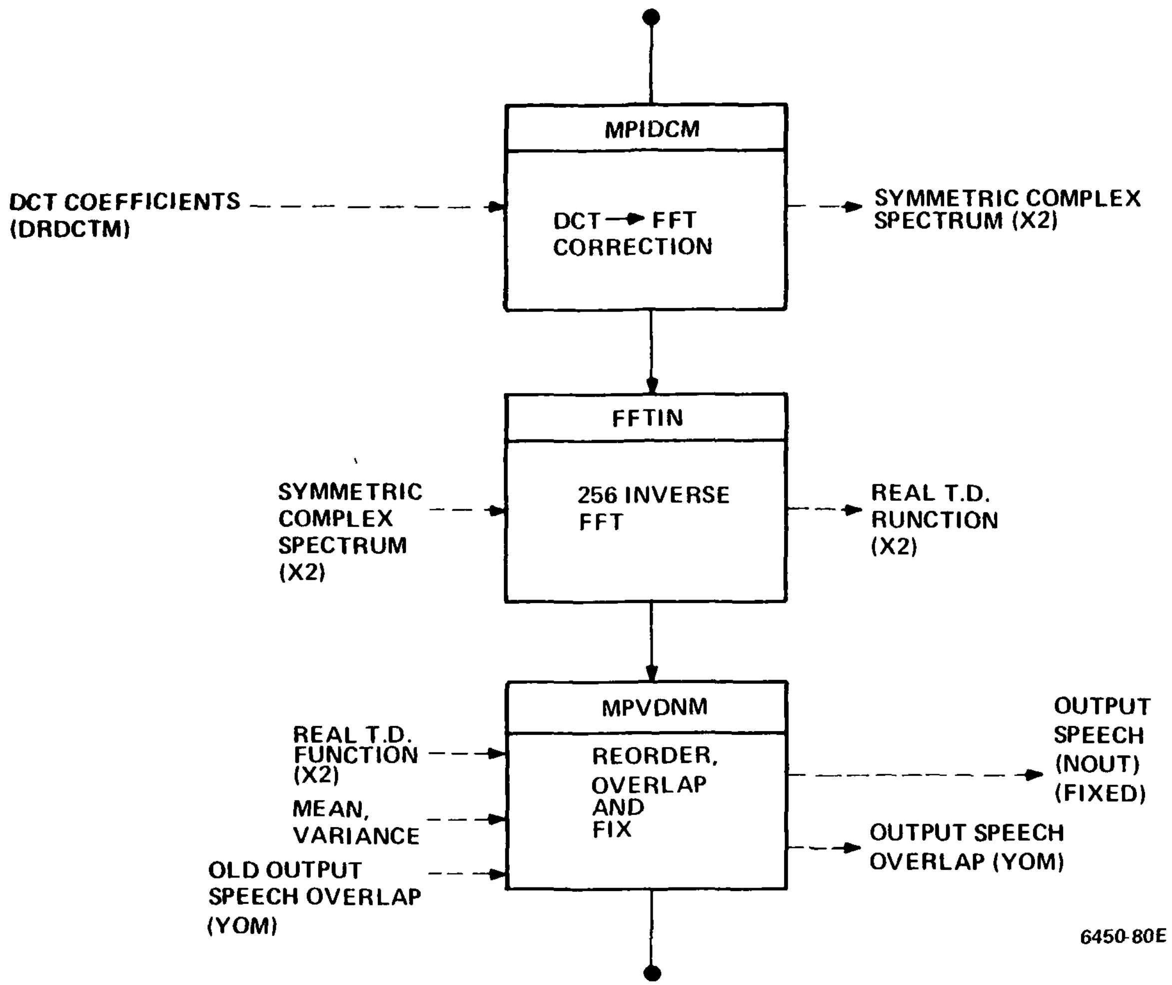


FIGURE 3-25: INVERSE DCT PROCEDURE

$$XR(K) = XR(N-K) = \cos(\pi K/2N)*DCT(K) + \sin(\pi K/2N)*DCT(N-K)$$

$$XI(K) = -XI(N-K) = \sin(\pi K/2N)*DCT(K) - \cos(\pi K/2N)*DCT(N-k)$$

$$XR(0) = DCT(0),\ XI(0) = \emptyset$$

where N is 256 and K varies between 1 and 255.

This array function also computes a corrected mean and variance from the (delayed) dequantized mean and variance. The dequantized variance (scalar 101) is in dB and is changed to be linear. The dequantized mean (scalar 100) is multiplied by this linear variance to form an adjusted mean. Finally, the linear variance is divided by the frame length to form the per sample variance. The resulting mean and variance are stored in scalars 100 and 101, respectively.

3.2.6.7.2 FFTIN (FCB 206, PBFCB 171)

This array function, supplied by CSPI, performs a 256 complex inverse FFT (not in place) on the corrected DCT coefficients in buffer X2. The resulting time domain function is also stored in X2.

3.2.6.7.3 MPVDNM (FCB 253, PBFCB 166)

This array function restores natural order to the 256 point time domain function in X2, multiplies it by the variance (scalar 101), adds the mean (scalar 100), and overlaps the result with the last 10 samples of the output from the previous frame to form 246 output speech samples which are stored in buffer NOVT.

The overlapping consists of multiplying the first 10 samples by an increasing ramp and the last 10 samples of the previous frame by a descending ramp and adding the results as follows:

OUTPUT(I) = NEW(I)*.1*I + OLD (236) * (1-.1*I)

where I ranges from 0 through 9.

The reordering of the time domain function forms the even numbered DCT coefficients from the first half of the real parts of buffer X2. The odd numbered coefficients are obtained by accessing the second half of the buffer in reverse order.

3.2.7 Executive Process

The Executive process is used to schedule the tasks performed by the Arithmetic Processor and the CSPU. The Executive, as supplied by CSPI, runs in the CSPU and assigns the AP sequential tasks from function lists, loading the AP with and starting it on a new array function as soon as it has finished with the previous one. Responding to interrupts and this AP scheduling are the only functions required of the CSPU in the standard SNAP software system. The ATC system, however, also uses the CSPU to perform computations required by the algorithm and unsuited to the AP, such as serialization and error correction. The standard SNAP executive has been modified to include this additional use of the CSPU.

3.2.7.1 Executive Modifications

The new CSPU program, which will be referred to as the Background program, actually includes the four background processes and a dispatch routine to schedule them. It is interfaced to the existing executive as a co-routine. However, in order to minimize modifications to the executive, it is implemented as a single interrupt routine containing multiple exits.

The standard Executive loads and starts the AP, prepares the next function to be loaded into the AP, and then waits for the AP to finish. The ATC modification changes this wait to a programmed interrupt (Device 24, level 8) which causes the Background program to continue from its last exit. The Background program periodically checks flag APDNFL (integer scalar 126) to determine whether the AP has finished. If it has, the Background program saves its state and exits, returning to the point in the Executive program following the original wait. The Executive then continues normally, restarting the AP and preparing the next array function, until it again reaches the state where it would wait for the AP.

The APDONE interrupt service routine, also part of the original Executive, has been modified for this new program structure. It now sets APDNFL before returning.

3.2.7.2 Process Scheduling

The process scheduling required in the ATC system includes the scheduling of the Analyze and Synthesize processes as well as the scheduling of the four I/O process background programs. The internal scheduling of array functions in the Analyze and Synthesize processes is accomplished by function lists, as described in subsection 3.3. The scheduling of the processes themselves is determined by flags ANA (integer scalar 100) and SYN (integer scalar 102) as shown in Figure 3-26. The Analyze process is enabled by flag ANA being clear. ANA is cleared by the Transmit interrupt routine to indicate that the last output has been used and the output buffer is available. ANA is set by the Transmit background program, which will fill the output buffer. The Synthesize process is enabled by flag SYN being clear. SYN is cleared by the Re-

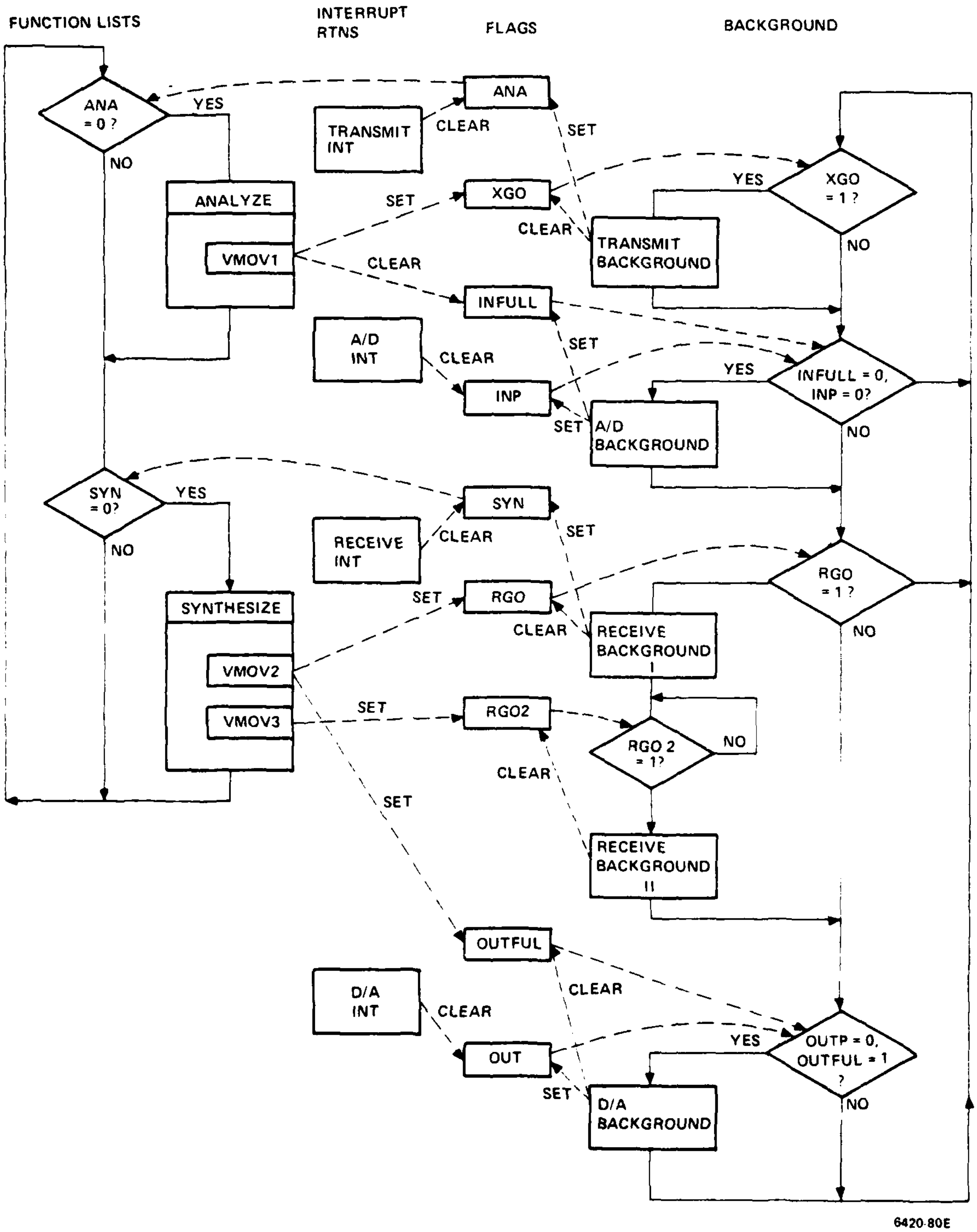


FIGURE 3-26: PROCESS SYNCHRONIZATION

ceive interrupt routine to indicate that the input buffer has been filled and is, therefore, available. SYN is set by the Receive background program which will read this buffer.

The Transmit background program is enabled by flag XGO being set. It is set by VMOV1 in the Analyze process when the output data has been copied into buffers AQPB and ACTDCT and is thus available to the Transmit background process. The background process clears the flag.

The Receive background program is enabled by flag RGO being set. It is set by VMOV2 in the Synthesize process when the data in ARQPB has been copied into a processing buffer, thus making ARQPB available for writing by the Receive background program, which clears the flag. When the Receive background program has deserialized the sideband parameters, it waits until the bit allocation determined by the Synthesize process is made available to it. VMOV3 in the Synthesize process sets flag RGO2 when it has written new data into buffer RIBIT. RGO2 being set enables the Receive background program to proceed to deserialize the DCT coefficients and to clear RGO2.

The A/D background program is enabled by a combination of two flags. It runs when new input is available to it and its previous output has been used. Flag INP is cleared by the A/D interrupt routine to indicate that new input data is available. Flag INFULL is cleared by VMOV1 in the Analyze process to indicate that it has read the previous output of the background program (INPB) and that buffer is available for refilling. The A/D background program sets both of these flags.

The D/A background program is also enabled by a combination of two flags. It runs when its output buffer is empty and its input buffer is

full. Flag OUTP is cleared by the D/A interrupt routine to indicate that a buffer has been emptied and is available for more output. Flag OUTFUL is set by VMOV2 in the Synthesize process when new output speech has been copied to buffer OUTB and is available to the background program. The background program clears OUTFUL and sets OUTP.

3.3 System Software

The ATC system software consists of MAP-300 software and host PDP-11 software.

3.3.1 MAP-300 Software

The MAP-300 software includes the array functions described individually in section 3.2 and the Executive program. It also includes the IOS-2SM program, LINE. Areas of MAP memory used by the MAP-300 software are shown in Table 3-9.

3.3.1.1 Array Functions

The array functions contained in the ATC system are shown in Table 3-10. The starred functions have been written by GTE. All other array functions normally included in the CSPI SNAP II system have been deleted. This means that before a program using any of these deleted functions can be run after running the ATC system, the standard SNAP II system must be reloaded into the MAP.

3.3.1.2 Executive Program

The Executive program that is included in the ATC system has been modified from the standard SNAP II release. The modifications consist of a revised APDONE routine which has had buffer checking eliminated for reasons of efficiency and which has added flag control and additional software to provide computational support for the AP. The additions to the Executive are described in subsection 3.2.7.

Bus 1

0-21FE	EXEC
2260-38A4	Prebinding Buffers
4000-4678	SNAP Array Functions
4690-49C4	FF2R
49DØ-515A	IOS
5714-5BC4	Scroll Program Buffers
639C-6EC4	GTE Array Functions
7150-89F8	GTE Array Functions
8AØØ-8AA5	Data Buffers
8AA6-AC6Ø	CSPUIS (background programs)
AC62-ACA8	Scroll Interrupt Additions
BFFF	Top of Memory

Bus 2

400-17CØ	Data Buffers
1D30-23ØD	Table Storage
231E-2F43	Data Buffers
3FFF	Top of Memory

Bus 3

0-1FFF	Data Buffers
1FFF	Top of Memory

TABLE 3-9: MEMORY MAP

Function	FCB Number	GTE-Supplied
VFLT (Y, A, U, B)	136	
VMOV (Y, U)	143	
VSMA1 (Y, A, U, B)	144	
VCOS (Y, A, U, B, V, C)	186	
FFTN (Y, U, V, W)	204	
FFTNB	205	
FFTIN (Y, U, V, W)	206	
FFTINB	207	
FF2R (Y, U, V, W)	214	
FF2RB	215	
VMOV1 (Y)	237	*
VMOV2 (Y)	238	*
VMOV3 (Y)	239	*
MPFDVM (Y, U, V)	240	*
MPDCTM (Y, U, V, W)	241	*
MPQDPP (Y, U, V)	242	*
MPDQPP (Y, U, V)	243	*
MPMWGX (Y, U, V, W)	244	*
MPFSTV (U)	245	*
MPSSRT (Y)	247	*
MPIDCM (Y, U, V)	248	*
MPASRT (Y)	249	*
MPFSTQ (Y, U, V, W)	250	*
MPFSTD (Y, U, V, W)	251	*
MPVDNM (Y, U, V)	252	*
MPBASP (Y, U, V, W)	253	*
MPSCAN (Y)	254	*
MPCDBA (Y)	255	*

TABLE 3-10: ARRAY FUNCTIONS

3.3.1.3 LINE Program

This program runs in the IOS-2SM scroll. It is loaded, initialized, and started by the host Fortran program. The function and operation of this program is described in subsection 3.2.3.1.

3.3.2 PDP-11 Software

The PDP-11 software consists of a Fortran control program, used to configure and initialize MAP buffers and to define function lists; software which provides the interface between this control program and the MAP driver; and utility software which provides an improved user interface to the MAP assembler.

3.3.2.1 Fortran Control Program

The Fortran control program consists of five major segments. These are: Configure and Initialize Buffers and Scalars (MAPON), Prebind Functions (CREATE), Define Function Lists (DEFINE), Configure Scroll Programs (SETUP), and Execute Function List (System).

These five segments are each subroutines, contained in separate overlays. The main program, MASTER, calls these subroutines in sequence. Data is passed between the main program and the subroutines through named common blocks. Other subroutines, mainly debugging aids, are included in the Fortran program which was designed to operate in any of three modes - Real-Time, Timing, and File-to-File. Only the Real-Time mode is operative in the delivered system.

3.3.2.1.1 Configure and Initialize Buffers

The buffer locations, sizes, types, and identifiers are shown in Table 3-11. The buffer initialization defines three cosine vectors.

MAP-300
BUFFER AREAS

BID	BID #	BUS	BA	BA+NS-1	NS	ST	SI	WS
AOPB	43	1	35328.	35341.	14	I	E	L
AOTDCT	44	1	35342.	35597.	256	I	E	L
AIBIT	45	1	35598.	35853.	256	I	E	L
SEN	49	1	35854.	36223.	370	I	E	L
INPB	50	1	36224.	36479.	256	I	E	L
BF1	63	1	36480.	36848.	369	I	E	L
BF2		1	36849.	37217.	369	I	E	L
BF3		1	37218.	37586.	369	I	E	L
ZRO	1	1	37587.	37955.	369	I	E	L
OUTB	59	1	37956.	36211.	256	I	E	L
RECV	56	1	38212.	38581.	370	I	E	L
AROPB	57	1	38582.	38595.	14	I	E	L
AROBCT	58	1	38596.	38851.	256	I	E	L
SYNB1	62	1	38852.	39220.	369	I	E	L
SYNB2		1	39221.	39589.	369	I	E	L
RIBIT	2	1	39590.	36245.	256	I	E	L
BIDBF1	63	1	10000.	14499.	4500	I	E	L
BIDBF2		1	8800.	9999.	1200	I	E	L
COSZ	24	2	1024.0	1535.0	256	R	E	L
YOM	26	2	2048.0	2067.0	10	R	E	L
XOM	27	2	2068.0	2087.0	10	R	E	L
MAPX#	28	2	2068.0	2579.0	256	R	E	L
MIBIT	29	2	2088.0	2343.0	256	I	E	L

TABLE 3-11: ATC SYSTEM BUFFER CONFIGURATION

DCTM	30	2	2344.0	2855.0	256	R	E	L
		2	2856.0	2867.0	12	I	E	L
QTDCTM	32	2	2868.0	3123.0	256	I	E	L
NINM	33	2	3124.0	3369.0	246	I	E	L
NIN1	34	2	3370.0	3615.0	246	I	E	L
NIN2	35	2	3616.0	3861.0	246	I	E	L
NOUTM	36	2	3862.0	4107.0	246	I	E	L
NOUT1	37	2	4108.0	4353.0	246	I	E	L
NOUT2	38	2	4354.0	4599.0	246	I	E	L
RECV1	39	2	4600.0	4968.0	369	I	E	L
RECV2	40	2	4969.0	5337.0	369	I	E	L
SEN1	41	2	5340.0	5709.0	370	I	E	L
SEN2	42	2	5710.0	6079.0	370	I	E	L
DCT1T1	51	2	9000.0	9511.0	256	R	E	L
DCT1T2	52	2	9512.0	10023.0	256	R	E	L
IORDR1	53	2	10024.0	10279.0	256	I	E	L
IORDR2	54	2	10280.0	10535.0	256	I	E	L
MIBIT1	55	2	10536.0	10791.0	256	I	E	L
MIBIT2	60	2	10792.0	11047.0	256	I	E	L
QTDCT1	7	2	11048.0	11303.0	256	I	E	L
MIBIT3	5	2	11304.0	11559.0	256	I	E	L
MIBIT4	6	2	11560.0	11815.0	256	I	E	L
QPRM	31	2	11816.0	11829.0	14	I	E	L
QRPRM	8	2	11830.0	11843.0	14	I	E	L
QRDCTM	9	2	11844.0	12099.0	256	I	E	L
WORK	10	3	0.0	2047.0	512	C	E	L

TABLE 3-11: ATC SYSTEM BUFFER CONFIGURATION (CONT'D)

X1	11	3	2048.0	4095.0	512	C	E	L
X1R*		3			512	R	E	L
X1I*		3			512	R	E	L
X2	48	3	2048.0	3071.0	256	C	E	L
IORDRM#	12	3	0.0	255.0	256	I	E	L
PWEITM#	13	3	0.0	255.0	256	I	E	L
DCTM1#	14	3	512.0	1023.0	256	R	E	L
DCTM2#	15	3	1024.0	1535.0	256	R	E	L
R1#	16	3	0.0	17.0	9	R	E	L
A1#	17	3	18.0	33.0	8	R	E	L
KF#	18	3	35.0	66.0	16	R	E	L
PARC*	3	3			8	R	E	L
TMP1#	19	3	2048.0	2559.0	256	R	E	L
TMP2#	20	3	2560.0	3071.0	256	R	E	L
TMP3#	46	3	3584.0	4095.0	256	R	E	L
TMP4#	47	3	3072.0	3583.0	256	R	E	L
ORDCTM#	21	3	1024.0	1535.0	256	R	E	L
YNM#		3	512.0	1023.0	256	R	E	L
VLONG	23	2	4096.0	5119.0	512	R	E	L
VSHRT	25	2	5120.0	5631.0	256	R	E	L

TABLE 3-11: ATC SYSTEM BUFFER CONFIGURATION (CONT'D)

Two of these, VSHRT and VLONG, are used for FFT's and contain a full cycle of the cosine each, consisting of 256 and 512 points, respectively. The third, COSZ, is used in the DCT correction and contains one quarter cycle of the cosine in 256 points. The initialization also clears the overlap buffers XOM and YOM, the I/O buffers NIN1, NIN2, NOUT1, NOUT2, RECV1, RECV2, SEN1, and SEN2. It also clears the data delay line buffers AQPB, AQTDCT, DCT1T1, DCT1T2, QTDCT1, QPRM, and QRPRM, and the sync buffers BF1, BF2, SYNB1, and SYNB2. It stores a buffer of zeros, ZRO, for subsequent use by the ATC system. It initializes the reordering vectors IORDR1 and IORDR2 to be the integers from 0 to 255, and sets the bit allocation buffers, MIBIT1, MIBIT2, MIBIT3, and MIBIT3 to contain 134 values of two and the remainder of the values in these buffers to be zero.

The scalars used and their initial values are shown in Table 3-12.

3.3.2.1.2 Prebound FCB's

To reduce AP loading overhead, all array functions used in the real-time loop of the ATC system are prebound. That is, a separate copy of the APS portion of each array function is maintained for each set of calling parameters given the function. The values of these parameters are stored in the copy at pre-binding and the time copy is block-loaded into the APS at execution time. Table 3-13 lists the prebound functions and the associated calling parameters.

3.3.2.1.3 Function Lists

The prebound array functions are collected into function lists. The use of function lists allows the MAP to run independently of the host which, by eliminating host overhead, increases the speed of the system.

SID	NAME	DESCRIPTION	INITIAL VALUE	CONSTANT
50		constant	1/512.	*
51		constant	1/256.	*
52	unused			
53	unused			
54	LTHINV	LTH Inverse	1/256.	*
55	unused			
56	DARG	constant	1/1024.	*
57	MDARG	constant	1/1024.	*
58	unused			
.	.			
.	.			
.	.			
73	unused			
74	LPCNP1	LPC order +1	9	*
75	LPCN	LPC order	8	*
76		constant	4.0	*
77		constant	10E-10	*
78	unused			
79	BTLTH	Bits avail. for DCTs	268	*
80	CTEMP	Bit all offset	-	
81	unused			
82	BITSMN	Temp for CTEMP calc.	-	
83	ITOT	# of DCTs to be coded	-	
84	BITMAX	Max bits/DCT	3.0	*
85		CTEMP +.5	-	
86		LPC Threshold	.995	*
87	LTH	Frame Length	256	*
88	DQDC	Dequantized Mean	-	
89	DQVAR	Dequantized Variance	-	
90	DQPG	Dequantized Pitch Gain	-	
91	DQM	Dequantized Pitch	-	
92	LTH2	2*LTH	512	*
93		Inverse Variance	-	
94		constant	20.0	*
95		Log 16 (10)		*
96	LTH4	4*LTH	1024.	*
97	LTHM1	LTH-1	255	*
98		constant	.05	*
99	unused			
100	DC^{-2}	Mean from 2nd prev. frame	-	
101	VAR^{-2}	Variance from 2nd prev. frame	-	
102	DC^{-1}	Mean from prev. frame	-	
103	VAR^{-1}	Variance from prev. frame	-	

TABLE 3-12: SCALARS

```
STATUS=MPCBF(BIDBF1,153)
INSTR=153
STATUS=MPFDVM(MAPX,MINM,X2)
INSTR=154
STATUS=MPDCTM(DCTM,X1,X2,COSZ)
INSTR=155
STATUS=MPWWGX(R1,NIDM,KF,A1)
INSTR=156
STATUS=MPQDPP(QPRM,PARC,A1)
INSTR=157
STATUS=MPFSTV(A1)
INSTR=158
STATUS=MPBASP(DCTM1,PWEITM,TMP2,X1)
INSTR=159
STATUS=MPASRT(IORDRM)
INSTR=160
STATUS=MPSCAN(DCTM2)
INSTR=161
STATUS=MPCDBA(MIBIT3)
INSTR=162
STATUS=MPFSTQ(QTDCTM,MIBIT3,TMP1,TMP2)
INSTR=163
STATUS=MPDQPP(PARC,QRPRM,A1)
INSTR=164
STATUS=MPFSTD(DRDCTM,QRDCTM,TMP1,IORDR2)
INSTR=165
STATUS=MPIDCM(X2,DRDCTM,COSZ)
INSTR=166
STATUS=MPVDNM(NOUTM,YOM,X2)
INSTR=167
STATUS=MPSSRT(IORDRM)
STATUS=MPTBF(0)
INSTR=3
STATUS=MPCBF(BIDBF2,168)
INSTR=168
STATUS=FFTIN(X2,1,X2,VSHRT,WORK)
INSTR=169
STATUS=FFTIN(X1,1,X1,VLONG,WORK)
INSTR=170
STATUS=FF2R(X1,4,X1,VLONG,WORK)
INSTR=171
STATUS=FFTIN(X2,1,X2,VSHRT,WORK)
INSTR=4
STATUS=MPTBF(0)
STATUS=MPCBF(BIDBF3,172)
INSTR=172
STATUS=VMOV1(AQPB)
INSTR=173
STATUS=VMOV2(QRPRM)
INSTR=174
STATUS=VMOV3(RIBIT)
INSTR=175
STATUS=MPCDBA(MIBIT1)
STATUS=MPTBF(0)
```

TABLE 3-13: PREBOUND FCB'S

The top level function list (WAIT) is very simple. It consists of three subordinate function lists, STRTUP, ATCSYN, and ATCANA, which are conditionally executed or not based on the state of three associated scalars, INIT, SYN, and ANA. STRTUP is executed only once. Its execution causes INIT to be set to unity, which denies the execution condition for all succeeding passes through the main function list. STRTUP initializes the process synchronization flags and double buffer pointers as shown in Table 3-14. It also loads and starts the three I/O scrolls.

Both ATCSYN and ATCANA are unconditional, sequential lists of prebound array functions. They are shown in Table 3-15. ATCANA is the control structure of the Analyze process, as discussed in section 3.2.5, and ATCSYN is the control structure of the Synthesize process, as discussed in section 3.2.6.

3.3.2.2 Host Support Software

The host support software consists of a function definition module for each array function, an additional function, FCBGN, called by each of these definitions, error reporting routines, and the MAP driver interface routine. This software is contained in the SNAPHS library. This library has been modified for the ATC system, as detailed in section 3.5. The changes are to delete unused array function definitions, to make separate libraries for each of the three MAP drivers in the host operating system, and to change FCBGN to support newly released array functions. This last modification increases the size of table ISARG from 18 to 22. ISARG contains parameter usage configurations. The ATC system requires these additional configurations.

Flag	Integer Scalar	Value	Meaning	Description
OUT	104	1	false	A/D buffer full
INP	106	1	false	D/A buffer empty
AFLG	101	0	buffer 1	current send buffer
SFLG	103	0	buffer 1	current receive buffer
IFLG	107	0	buffer 1	current A/D buffer
OFLG	105	0	buffer 1	current D/A buffer
APDNFL	126	0	false	APDONE has occurred
RGO	114	0	false	enable Receive background
RGO2	116	0	false	enable Receive background part 2
XGO	115	0	false	enable Transmit background
INFULL	110	0	false	Analyze input full
OUTFUL	111	0	false	Synthesize output full
SYNC	117	0	-	sync position
RSYN	118	0	sync lost	sync state
NEWSYN	119	0	-	frames since sync acquired
OLSYN	120	0	-	previous frame sync bit
LSTER	121	0	false	error previous frame
ERSYN	122	0	-	number of sync bit errors

TABLE 3-14: SYSTEM FLAG INITIALIZATION

```
C         LIST "WAIT": THE WAIT LOOP
          STATUS=MPBFL(WAIT)
          STATUS=MPIIF(INIT,EQ,0,STRTUP,FL0)
          STATUS=MPIIF(SYN,EQ,0,ATCSYN,FL0)
          STATUS=MPIIF(ANA,EQ,0,ATCANA,FL0)
          STATUS=MPEFL(FL3)

C         LIST "STRTUP":INITIALIZATION LOOP
          STATUS=MPBFL(STRTUP)
          STATUS=MPIST(INIT,1)
          STATUS=MPIST(OUT,1)
          STATUS=MPIST(INP,1)
          STATUS=MPIST(AFLG,0)
          STATUS=MPIST(SFLG,0)
          STATUS=MPIST(IFLG,0)
          STATUS=MPIST(OFLG,0)
          STATUS=MPIST(INFULL,-1)
          STATUS=MPIST(OUTFUL,-1)
          STATUS=MPIST(APDNFL,0)
          STATUS=MPIST(RGO,0)
          STATUS=MPIST(XGO,0)
          STATUS=MPIST(RGO2,0)
          STATUS=MPIST(SYNC,0)
          STATUS=MPIST(RSYN,0)
          STATUS=MPIST(WFNSYN,0)
          STATUS=MPIST(OLSYN,0)
          STATUS=MPIST(LSTER,0)
          STATUS=MPIST(FPSYN,0)
          STATUS=MPLDS(AOM,IOS,AOMPM)
          STATUS=MPRNS(AOM,IOS,AOMSA)
          STATUS=MPLDS(ADAM,IOS,ADAMPM)
          STATUS=MPRNS(ADAM,IOS,ADAMSA)
          STATUS=MPLDS(IOSID,IOS,IOSPM)
          STATUS=MPRNS(IOSID,IOS,IOSSA)
          STATUS=MPEFL(FL4)
```

TABLE 3-15: FUNCTION LISTS

```
C         LIST "ATCANA": ATC ANALYZER W/ERROR CODING AND SERIALIZATION
          INSTR=1043
          STATUS=MPRFL(ATCANA)
C         BF(172)=VMOV1(AQPB)
          STATUS=MPXBF(172)
C         BF(153)=MPEDVM(MAPX,BINM,X2)
          STATUS=MPXBF(153)
C         BF(168)=FFTN(X2,1,X2,VSHRT,WORK)
          STATUS=MPXBF(168)
C         BF(154)=MPDCTM(DCTM,X1,X2,COSZ)
          STATUS=MPXBF(154)
C         BF(169)=FFTIN(X1,1,X1,VLONG,WORK)
          STATUS=MPXBF(169)
C         BF(155)=MPMWGX(R1,BINM,KE,A1)
          STATUS=MPXBF(155)
C         BF(156)=MPQDPP(QPRM,PARC,A1)
          STATUS=MPXBF(156)
C         BF(157)=MPESIV(A1)
          STATUS=MPXBF(157)
C         BF(170)=FF2P(X1,4,X1,VLONG,WORK)
          STATUS=MPXBF(170)
C         BF(158)=MPRASP(DCTM1,PWRITM,TMP2,X1)
          STATUS=MPXBF(158)
C         BF(159)=MPASRT(IORDRM)
          STATUS=MPXBF(159)
C         BF(160)=MPSCAN(DCTM2)
          STATUS=MPXBF(160)
C         BF(161)=MPCDRA(WRITT3)
          STATUS=MPXBF(161)
C         BF(162)=MPESTO(QTDCTM,WRITT,TMP1,TMP2)
          STATUS=MPXBF(162)
C         IF(TIMING.EQ.YES)STATUS=MPXFL(ATCSYN)
          INSTR=1050
          STATUS=MPRFL(FL1)
C
```

TABLE 3-15: FUNCTION LISTS (CONT'D)

```
C         LIST "ATCSYN": ATC SYNTHESIZER W/ERROR DECODER & DESERIALIZATION
          INSTR=1055
          STATUS=MPREL(ATCSYN)
C         BF(173)=VMOV2(ORPRM)
          STATUS=MPXBF(173)
C         BF(163)=MPPOWER(PARC,ORPRM,A1)
          STATUS=MPXBF(163)
C         BF(157)=MPESTV(A1)
          STATUS=MPXBF(157)
C         BF(170)=FF2R(X1,4,X1,VLONG,WORK)
          STATUS=MPXBF(170)
C         BF(158)=MPBASP(DCTM1,PXEITM,TMP2,X1)
          STATUS=MPXBF(158)
C         BF(167)=MPSSRI(IORDRM)
          STATUS=MPXBF(167)
C         BF(160)=MPSCAN(DCTM2)
          STATUS=MPXBF(160)
C         BF(175)=MPCDBA(MINIT1)
          STATUS=MPXBF(175)
C         BF(174)=VMOV3(RINIT)
          STATUS=MPXBF(174)
C         BF(164)=MPESTD(DRDCTM,QRDCTM,TMP1,IORDR2)
          STATUS=MPXBF(164)
C         BF(165)=MPIDCM(X2,DRDCTM,COSZ)
          STATUS=MPXBF(165)
C         BF(171)=FFTIN(X2,1,X2,VSHRT,WORK)
          STATUS=MPXBF(171)
C         BF(166)=MPVDMM(NOUTM,YOM,X2)
          STATUS=MPXBF(166)
          STATUS=MPREL(FL2)
```

TABLE 3-15: FUNCTION LISTS (CONT'D)

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

UNCLASSIFIED NL

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AD
A091663

3.3.2.3 Utility Software

A utility program, PREMAP, is included in the delivered ATC system. This program reformats text file to be acceptable to the MAP assembler, MAPASM. In particular, it changes tabs in the input text to sequences of spaces in the output text and supplies continuation lines for comments.

3.4 System Hardware

The ATC system includes equipment manufactured by CSP Inc., Billerica, Mass., and equipment designed and built by GTE Sylvania.

3.4.1 CSPI-Supplied Hardware

The CSPI-supplied hardware consists of a MAP-300 Array Processor, Model 1030, with attached options. These options are:

8K x 32 MOS Master Memory, 500 nsec, Bus 1, model 2030
16K x 32 MOS Slave Memory, 500 nsec, Bus 1, model 2050
8K x 32 MOS Master Memory, 300 nsec, Bus 2, model 2203
4K x 32 MOS Master Memory, 170 nsec, Bus 3, model 2410
PDP-11 Interface, model 3110
I/O Scroll type 2SM, model 4020
Bus Switch (2), model 4040
Analog Data Acquisition Module (ADAM), model 5120
Analog Output Module (AOM), model 5130
Expansion Chassis, model 6100
Auxiliary Power Supply, model 6200

The MAP includes preprogrammed micro-code in read-only memory. The ATC system requires Revision 18 of this micro-code.

3.4.2 GTE-Supplied Hardware

The GTE-supplied hardware consists of the Speech Processing Interface (SPI), which provides an analog interface to the MAP, and the Full Duplex Interface (FDI), which provides a digital interface to the MAP. These interfaces were supplied to two other contractors as well as being used in the GTE ATC system.

As the ATC project progressed, it became apparent that modifications to the GTE-supplied hardware were required. Subsection 3.4.2.3 describes these modifications.

3.4.2.1 GTE Speech Processing Interface (SPI)

The SPI assembly provides the amplification, equalization, and filtering necessary to interface an audio handset to the MAP-300 A/D and D/A converters. A block diagram of the SPI is shown in Figure 3-27. The SPI also serves as the common junction point for all digital signals between the MAP-300 and an external modem. The interconnections between the MAP, the SPI, and the external devices are shown in Figure 3-28.

A switch on the SPI front panel, which is shown in Figure 3-29, permits the selection of either of two sets of filters, thereby permitting a choice of cutoff frequency. Filters having cutoff frequencies of 3200 Hz and 3800 Hz are provided. The filters are of the plug-in type, thereby enabling the user to install other filters with different cutoff frequencies of his choice if so desired.

The handset provided with the equipment uses a dynamic microphone which has been designed to GTE Sylvania specifications and nas been optimized for use in speech processing applications. The handset connects directly to the front panel of the audio interface assembly and may be stored on the hookswitch, which is also located on the front panel. When "on hook," the audio circuits (both receiving and transmitting) for the handset are disabled. A 25-foot extension cable for use with the handset is also provided.

A pair of telephone jacks located on the rear panel of the audio interface unit (shown in Figure 3-30) may be used to connect a tape recorder or test equipment for test and measurement purposes. The audio circuits for the tape recorder are always active and are unaffected by the operation of the hookswitch. A single connector, also located on the rear panel, is used to connect the assembly to the A/D-D/A converters of the MAP-300. Table 3-16gives the specifications of the SPI.

Handset Interface

Input impedance	150 ohms, balanced
Output impedance	150 ohms, balanced
Gain, input to A/D converter	42 dB
Gain, D/A converter to output	-24 dB

Tape Recorder Interface

Input impedance	600 ohms, balanced
Output impedance	600 ohms, balanced
Gain, input to A/D converter	0 dB
Gain, D/A converter to output	0 dB

MAP-300 Interface

Output impedance - A/D converter	3000 ohms
Signal level - A/D converter	±5 V pk-pk
Input impedance - D/A converter	3000 ohms
Signal level - D/A converter	±5 V pk-pk

Filter Characteristics

Cutoff frequency	3.2 KHz / 3.8 KHz (switch selectable)
Rolloff	130 dB per octave

TABLE 3-16: SPI SPECIFICATIONS

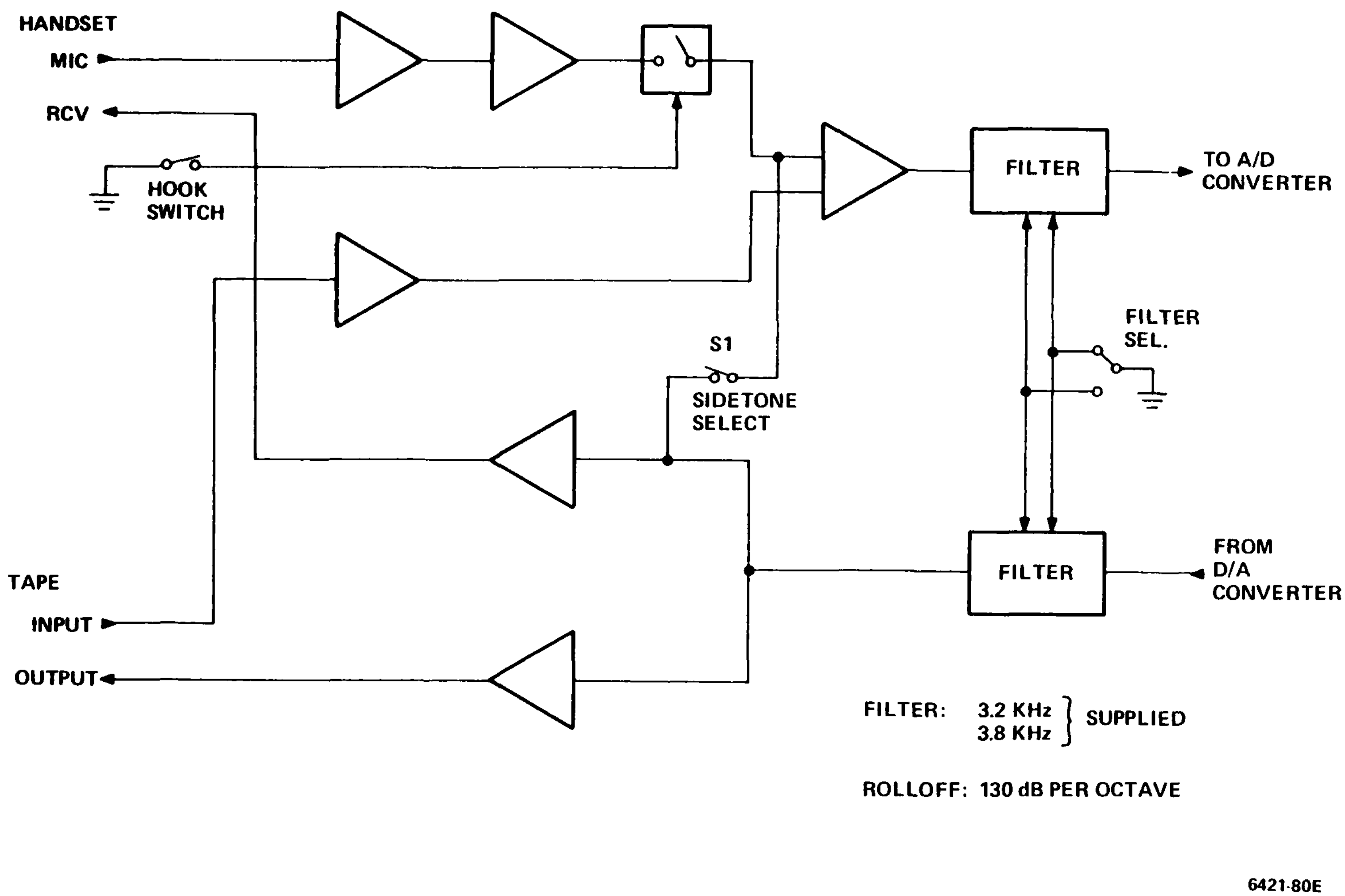


FIGURE 3-27: SPI BLOCK DIAGRAM

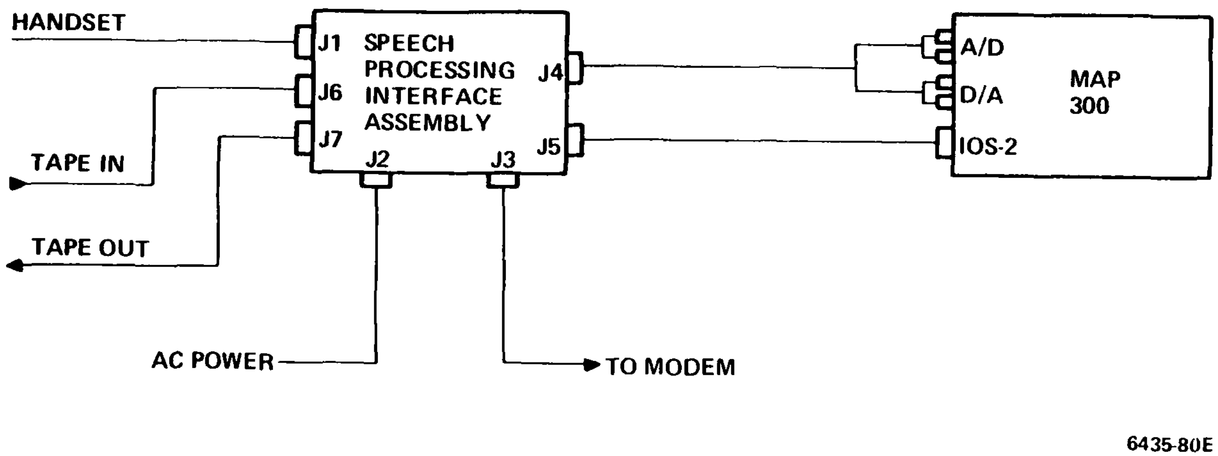


FIGURE 3-28: INTERCONNECTION DIAGRAM

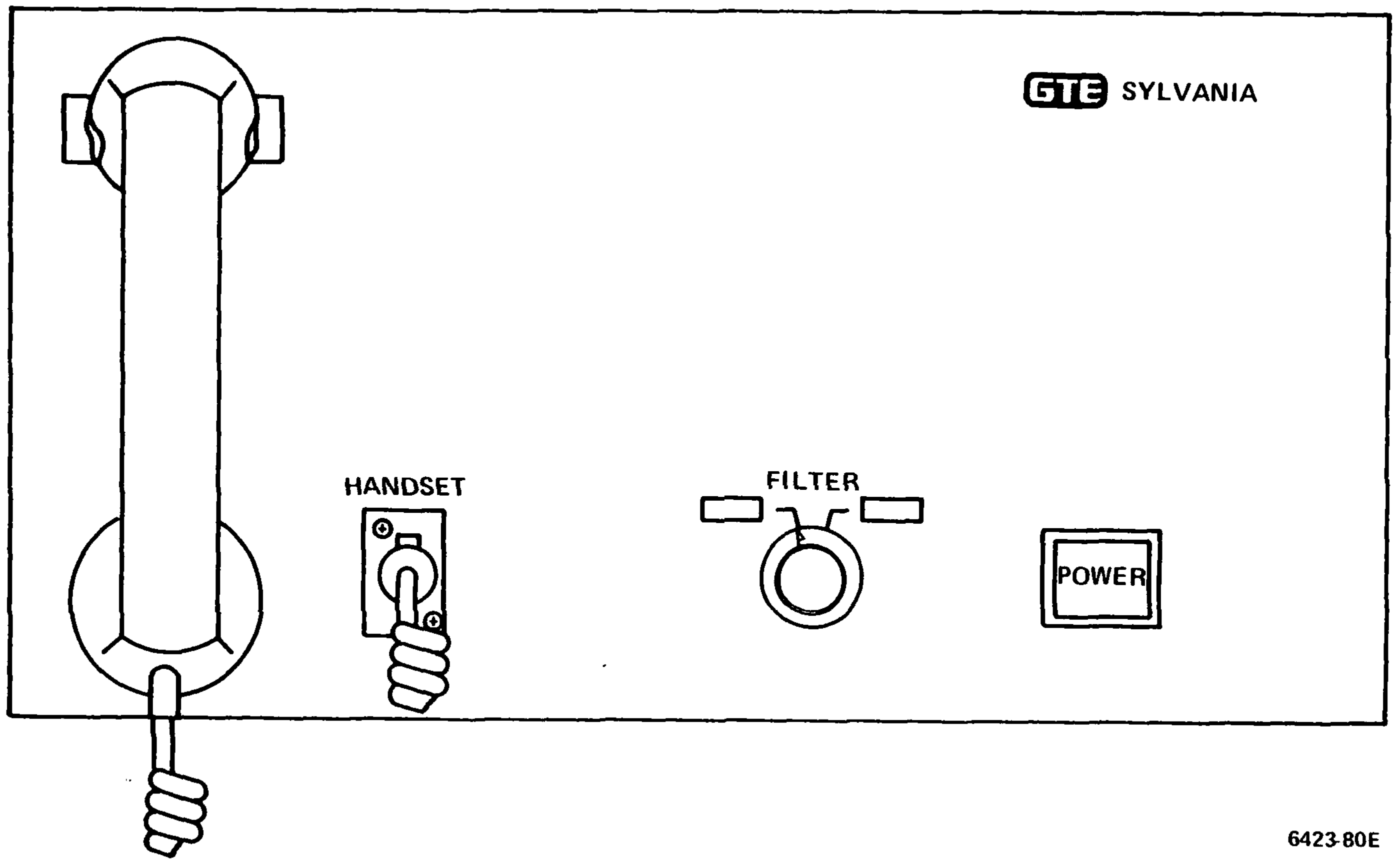
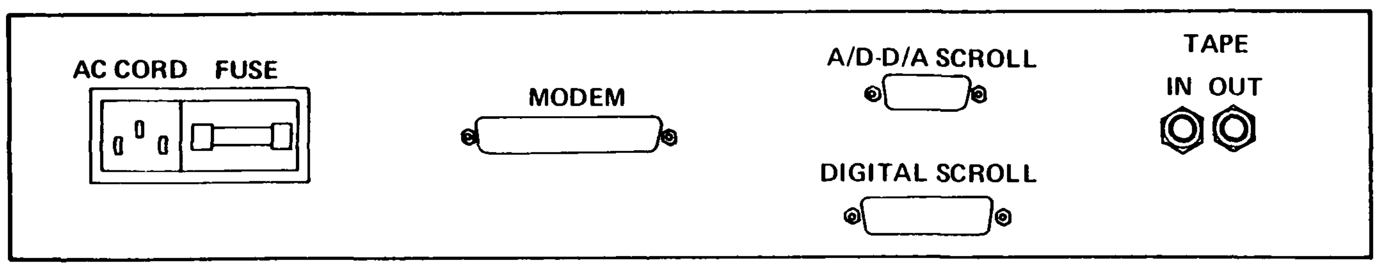


FIGURE 3-29: FRONT PANEL



6422-80E

FIGURE 3-30: REAR PANEL

3.4.2.2 Full Duplex Interface (FDI)

The CSPI IOS-2SM scroll has been modified by GTE Sylvania to provide a means for interfacing to any modem employing an EIA RS-449/RS-432 interface. The interface connections are given in Table 3-17. The interface design is such that an EIA RS-232-C interface may also be used, and the line drivers and receivers have been selected such that the protective networks for RS-449/RS-232 interoperation (refer to EIA Industrial Bulletin No. 12) are not required. Table 3-18 is a comparison between RS-449 and RS-232-C conventions. In addition to the modem interface, the modified I/O scroll includes a programmable real-time clock which generates the timing signals for speech sampling and the modem data. The I/O scroll is connected to the audio interface assembly by means of a single cable.

The data and speech sampling rates are set by issuing a single 16-bit control word from the IOS-2SM. The format of this control word and the FDT data formats are shown in Figure 3-31. The most significant byte of the control word determines the data rate, whereas the least significant byte determines the speech sampling rate. These control bytes and the associated data and sampling rates are given in Table 3-19. Each control byte controls a separate frequency divider. The basic clock frequency, 1.536 MHz, is first divided by four and then further divided by the selected divide ratio. The modem clock is then divided by an additional factor of two to produce a square wave with a 50% duty cycle. Once the real-time clock has been so programmed, it is not necessary to issue any other control words unless it is desired to change either of the clock rates, or unless power is removed from the MAP-300. It should be noted that the entire control word must be issued whenever changing rates, even if only one rate is to be changed.

PIN	SIGNAL
2	SI - Signal Rate Indicator
4	SD - Send Data
6	RD - Receive Data
7	RS - Request to Send
8	RT - Receive Timing
9	CS - Clear to Send
11	DM - Data Mode
12	TR - Terminal Ready
13	RR - Receiver Ready
15	IC - Incoming Call
16	SR - Signal Rate Selector
17	TT - Terminal Timing
19	SG - Signal Ground
20	RC - Receive Common
33	SQ - Signal Quality
37	SC - Send Common

TABLE 3-17: MODEM INTERFACE CONNECTIONS (RS-449)

RS-449		RS-232C	
SG	SIGNAL GROUND	AB	SIGNAL GROUND
SC	SEND COMMON		
RC	RECEIVE COMMON		
IS	TERMINAL IN SERVICE		
IC	INCOMING CALL	CE	RING INDICATOR
TR	TERMINAL READY	CD	DATA TERMINAL READY
DM	DATA MODE	CC	DATA SET READY
SD	SEND DATA	BA	TRANSMITTED DATA
RD	RECEIVE DATA	BB	RECEIVED DATA
TT	TERMINAL TIMING	DA	TRANSMITTER SIGNAL ELEMENT TIMING (DTE SOURCE)
ST	SEND TIMING	DB	TRANSMITTER SIGNAL ELEMENT TIMING (DCE SOURCE)
RT	RECEIVE TIMING	DD	RECEIVER SIGNAL ELEMENT TIMING
RS	REQUEST TO SEND	CA	REQUEST TO SEND
CS	CLEAR TO SEND	CB	CLEAR TO SEND
RR	RECEIVER READY	CF	RECEIVED LINE SIGNAL DETECTOR
SQ	SIGNAL QUALITY	CG	SIGNAL QUALITY DETECTOR
NS	NEW SIGNAL		
SF	SELECT FREQUENCY		
SR	SIGNALING RATE SELECTOR	CH	DATA SIGNAL RATE SELECTOR (DTE SOURCE)
SI	SIGNALING RATE INDICATOR	CI	DATA SIGNAL RATE SELECTOR (DCE SOURCE)
SSD	SECONDARY SEND DATA	SBA	SECONDARY TRANSMITTED DATA
SRD	SECONDARY RECEIVE DATA	SBB	SECONDARY RECEIVED DATA
SRS	SECONDARY REQUEST TO SEND	SCA	SECONDARY REQUEST TO SEND
SCS	SECONDARY CLEAR TO SEND	SCB	SECONDARY CLEAR TO SEND
SRR	SECONDARY RECEIVER READY	SCF	SECONDARY RECEIVED LINE SIGNAL DETECTOR
LL	LOCAL LOOPBACK		
RL	REMOTE LOOPBACK		
TM	TEST MODE		
SS	SELECT STANDBY		
SB	STANDBY INDICATOR		

TABLE 3-18: RS-449/RS-232C COMPARISON

PROGRAMMABLE OSCILLATOR OUTPUT RATES

OSCILLATOR FREQUENCY = 1.536 MHZ

COUNTER SETTING DECIMAL	HEXADECIMAL	BINARY	DIVIDE RATIO	OUTPUT RATE - KHZ LINE	SPEECH
0	00	00000000	256	0.750	1.500
1	01	00000001	255	0.753	1.506
2	02	00000010	254	0.756	1.512
3	03	00000011	253	0.759	1.518
4	04	00000100	252	0.762	1.524
5	05	00000101	251	0.765	1.530
6	06	00000110	250	0.768	1.536
7	07	00000111	249	0.771	1.542
8	08	00001000	248	0.774	1.548
9	09	00001001	247	0.777	1.555
10	0A	00001010	246	0.780	1.561
11	0B	00001011	245	0.784	1.567
12	0C	00001100	244	0.787	1.574
13	0D	00001101	243	0.790	1.580
14	0E	00001110	242	0.793	1.587
15	0F	00001111	241	0.797	1.593
16	10	00010000	240	0.800	1.600
17	11	00010001	239	0.803	1.607
18	12	00010010	238	0.807	1.613
19	13	00010011	237	0.810	1.620
20	14	00010100	236	0.814	1.627
21	15	00010101	235	0.817	1.634
22	16	00010110	234	0.821	1.641
23	17	00010111	233	0.824	1.648
24	18	00011000	232	0.828	1.655
25	19	00011001	231	0.831	1.662
26	1A	00011010	230	0.835	1.670
27	1B	00011011	229	0.838	1.677
28	1C	00011100	228	0.842	1.684
29	1D	00011101	227	0.846	1.692
30	1E	00011110	226	0.850	1.699
31	1F	00011111	225	0.853	1.707
32	20	00100000	224	0.857	1.714
33	21	00100001	223	0.861	1.722
34	22	00100010	222	0.865	1.730
35	23	00100011	221	0.869	1.738
36	24	00100100	220	0.873	1.745
37	25	00100101	219	0.877	1.753
38	26	00100110	218	0.881	1.761
39	27	00100111	217	0.885	1.770
40	28	00101000	216	0.889	1.778
41	29	00101001	215	0.893	1.786

TABLE 3-19: REAL TIME CLOCK CONTROL

PROGRAMMABLE OSCILLATOR OUTPUT RATES

COUNTER SETTING DECIMAL	HEXADECIMAL	BINARY	DIVIDE RATIO	OUTPUT RATE - KHZ LINE	SPEECH
42	2A	00101010	214	0.897	1.794
43	2B	00101011	213	0.901	1.803
44	2C	00101100	212	0.906	1.811
45	2D	00101101	211	0.910	1.820
46	2E	00101110	210	0.914	1.829
47	2F	00101111	209	0.919	1.837
48	30	00110000	208	0.923	1.846
49	31	00110001	207	0.928	1.855
50	32	00110010	206	0.932	1.864
51	33	00110011	205	0.937	1.873
52	34	00110100	204	0.941	1.882
53	35	00110101	203	0.946	1.892
54	36	00110110	202	0.950	1.901
55	37	00110111	201	0.955	1.910
56	38	00111000	200	0.960	1.920
57	39	00111001	199	0.965	1.930
58	3A	00111010	198	0.970	1.939
59	3B	00111011	197	0.975	1.949
60	3C	00111100	196	0.980	1.959
61	3D	00111101	195	0.985	1.969
62	3E	00111110	194	0.990	1.979
63	3F	00111111	193	0.995	1.990
64	40	01000000	192	1.000	2.000
65	41	01000001	191	1.005	2.010
66	42	01000010	190	1.011	2.021
67	43	01000011	189	1.016	2.032
68	44	01000100	188	1.021	2.043
69	45	01000101	187	1.027	2.053
70	46	01000110	186	1.032	2.065
71	47	01000111	185	1.038	2.076
72	48	01001000	184	1.043	2.087
73	49	01001001	183	1.049	2.098
74	4A	01001010	182	1.055	2.110
75	4B	01001011	181	1.061	2.122
76	4C	01001100	180	1.067	2.133
77	4D	01001101	179	1.073	2.145
78	4E	01001110	178	1.079	2.157
79	4F	01001111	177	1.085	2.169
80	50	01010000	176	1.091	2.182
81	51	01010001	175	1.097	2.194
82	52	01010010	174	1.103	2.207
83	53	01010011	173	1.110	2.220

TABLE 3-19: REAL TIME CLOCK CONTROL (CONT'D)

PROGRAMMABLE OSCILLATOR OUTPUT RATES

OSCILLATOR FREQUENCY = 1.536 MHZ

DECIMAL	COUNTER SETTING HEXADECIMAL	BINARY	DIVIDE RATIO	OUTPUT RATE - KHZ LINE	SPEECH
84	54	01010100	172	1.116	2.233
85	55	01010101	171	1.123	2.246
86	56	01010110	170	1.129	2.259
87	57	01010111	169	1.136	2.272
88	58	01011000	168	1.143	2.286
89	59	01011001	167	1.150	2.299
90	5A	01011010	166	1.157	2.313
91	5B	01011011	165	1.164	2.327
92	5C	01011100	164	1.171	2.341
93	5D	01011101	163	1.178	2.356
94	5E	01011110	162	1.185	2.370
95	5F	01011111	161	1.193	2.385
96	60	01100000	160	1.200	2.400
97	61	01100001	159	1.208	2.415
98	62	01100010	158	1.215	2.430
99	63	01100011	157	1.223	2.446
100	64	01100100	156	1.231	2.462
101	65	01100101	155	1.239	2.477
102	66	01100110	154	1.247	2.494
103	67	01100111	153	1.255	2.510
104	68	01101000	152	1.263	2.526
105	69	01101001	151	1.272	2.543
106	6A	01101010	150	1.280	2.560
107	6B	01101011	149	1.289	2.577
108	6C	01101100	148	1.297	2.595
109	6D	01101101	147	1.306	2.612
110	6E	01101110	146	1.315	2.630
111	6F	01101111	145	1.324	2.648
112	70	01110000	144	1.333	2.667
113	71	01110001	143	1.343	2.685
114	72	01110010	142	1.352	2.704
115	73	01110011	141	1.362	2.723
116	74	01110100	140	1.371	2.743
117	75	01110101	139	1.381	2.763
118	76	01110110	138	1.391	2.783
119	77	01110111	137	1.401	2.803
120	78	01111000	136	1.412	2.824
121	79	01111001	135	1.422	2.844
122	7A	01111010	134	1.433	2.866
123	7B	01111011	133	1.444	2.887
124	7C	01111100	132	1.455	2.909
125	7D	01111101	131	1.466	2.931

TABLE 3-19: REAL TIME CLOCK CONTROL (CONT'D)

PROGRAMMABLE OSCILLATOR OUTPUT RATES

OSCILLATOR FREQUENCY = 1.536 MHZ

COUNTER SETTING			DIVIDE	OUTPUT RATE - KHZ	
DECIMAL	HEXADECIMAL	BINARY	RATIO	LINE	SPEECH
126	7E	01111110	130	1.477	2.954
127	7F	01111111	129	1.488	2.977
128	80	10000000	128	1.500	3.000
129	81	10000001	127	1.512	3.024
130	82	10000010	126	1.524	3.048
131	83	10000011	125	1.536	3.072
132	84	10000100	124	1.548	3.097
133	85	10000101	123	1.561	3.122
134	86	10000110	122	1.574	3.148
135	87	10000111	121	1.587	3.174
136	88	10001000	120	1.600	3.200
137	89	10001001	119	1.613	3.227
138	8A	10001010	118	1.627	3.254
139	8B	10001011	117	1.641	3.282
140	8C	10001100	116	1.655	3.310
141	8D	10001101	115	1.670	3.339
142	8E	10001110	114	1.684	3.368
143	8F	10001111	113	1.699	3.398
144	90	10010000	112	1.714	3.429
145	91	10010001	111	1.730	3.459
146	92	10010010	110	1.745	3.491
147	93	10010011	109	1.761	3.523
148	94	10010100	108	1.778	3.556
149	95	10010101	107	1.794	3.589
150	96	10010110	106	1.811	3.623
151	97	10010111	105	1.829	3.657
152	98	10011000	104	1.846	3.692
153	99	10011001	103	1.864	3.728
154	9A	10011010	102	1.882	3.765
155	9B	10011011	101	1.901	3.802
156	9C	10011100	100	1.920	3.840
157	9D	10011101	99	1.939	3.879
158	9E	10011110	98	1.959	3.918
159	9F	10011111	97	1.979	3.959
160	A0	10100000	96	2.000	4.000
161	A1	10100001	95	2.021	4.042
162	A2	10100010	94	2.043	4.085
163	A3	10100011	93	2.065	4.129
164	A4	10100100	92	2.087	4.174
165	A5	10100101	91	2.110	4.220
166	A6	10100110	90	2.133	4.267
167	A7	10100111	89	2.157	4.315

TABLE 3-19: REAL TIME CLOCK CONTROL (CONT'D)

PROGRAMMABLE OSCILLATOR OUTPUT RATES

OSCILLATOR FREQUENCY = 1.536 MHZ

DECIMAL	COUNTER SETTING HEXADECIMAL	BINARY	DIVIDE RATIO	OUTPUT RATE - KHZ LINE	SPEECH
168	A8	10101000	88	2.182	4.364
169	A9	10101001	87	2.207	4.414
170	AA	10101010	86	2.233	4.465
171	AB	10101011	85	2.259	4.518
172	AC	10101100	84	2.286	4.571
173	AD	10101101	83	2.313	4.627
174	AE	10101110	82	2.341	4.683
175	AF	10101111	81	2.370	4.741
176	B0	10110000	80	2.400	4.800
177	B1	10110001	79	2.430	4.861
178	B2	10110010	78	2.462	4.923
179	B3	10110011	77	2.494	4.987
180	B4	10110100	76	2.526	5.053
181	B5	10110101	75	2.560	5.120
182	B6	10110110	74	2.595	5.189
183	B7	10110111	73	2.630	5.260
184	B8	10111000	72	2.667	5.333
185	B9	10111001	71	2.704	5.408
186	BA	10111010	70	2.743	5.486
187	BB	10111011	69	2.783	5.565
188	BC	10111100	68	2.824	5.647
189	BD	10111101	67	2.866	5.731
190	BE	10111110	66	2.909	5.818
191	BF	10111111	65	2.954	5.908
192	C0	11000000	64	3.000	6.000
193	C1	11000001	63	3.048	6.095
194	C2	11000010	62	3.097	6.194
195	C3	11000011	61	3.148	6.295
196	C4	11000100	60	3.200	6.400
197	C5	11000101	59	3.254	6.508
198	C6	11000110	58	3.310	6.621
199	C7	11000111	57	3.368	6.737
200	C8	11001000	56	3.429	6.857
201	C9	11001001	55	3.491	6.982
202	CA	11001010	54	3.556	7.111
203	CB	11001011	53	3.623	7.245
204	CC	11001100	52	3.692	7.385
205	CD	11001101	51	3.765	7.529
206	CE	11001110	50	3.840	7.680
207	CF	11001111	49	3.918	7.837
208	D0	11010000	48	4.000	8.000
209	D1	11010001	47	4.085	8.170

TABLE 3-19: REAL TIME CLOCK CONTROL (CONT'D)

PROGRAMMABLE OSCILLATOR OUTPUT RATES

OSCILLATOR FREQUENCY = 1.536 MHZ PAGE 6

COUNTER SETTING			DIVIDE	OUTPUT RATE - KHZ	
DECIMAL	HEXADECIMAL	BINARY	RATIO	LINE	SPEECH
210	D2	11010010	46	4.174	8.348
211	D3	11010011	45	4.267	8.533
212	D4	11010100	44	4.364	8.727
213	D5	11010101	43	4.465	8.930
214	D6	11010110	42	4.571	9.143
215	D7	11010111	41	4.683	9.366
216	D8	11011000	40	4.800	9.600
217	D9	11011001	39	4.923	9.846
218	DA	11011010	38	5.053	10.105
219	DB	11011011	37	5.189	10.378
220	DC	11011100	36	5.333	10.667
221	DD	11011101	35	5.486	10.971
222	DE	11011110	34	5.647	11.294
223	DF	11011111	33	5.818	11.636
224	E0	11100000	32	6.000	12.000
225	E1	11100001	31	6.194	12.387
226	E2	11100010	30	6.400	12.800
227	E3	11100011	29	6.621	13.241
228	E4	11100100	28	6.857	13.714
229	E5	11100101	27	7.111	14.222
230	E6	11100110	26	7.385	14.769
231	E7	11100111	25	7.680	15.360
232	E8	11101000	24	8.000	16.000
233	E9	11101001	23	8.348	16.696
234	EA	11101010	22	8.727	17.455
235	EB	11101011	21	9.143	18.286
236	EC	11101100	20	9.600	19.200
237	ED	11101101	19	10.105	20.211
238	EE	11101110	18	10.667	21.333
239	EF	11101111	17	11.294	22.588
240	F0	11110000	16	12.000	24.000
241	F1	11110001	15	12.800	25.600
242	F2	11110010	14	13.714	27.429
243	F3	11110011	13	14.769	29.538
244	F4	11110100	12	16.000	32.000
245	F5	11110101	11	17.455	34.909
246	F6	11110110	10	19.200	38.400
247	F7	11110111	9	21.333	42.667
248	F8	11111000	8	24.000	48.000
249	F9	11111001	7	27.429	54.857
250	FA	11111010	6	32.000	64.000
251	FB	11111011	5	38.400	76.800

TABLE 3-19: REAL TIME CLOCK CONTROL (CONT'D)

PROGRAMMABLE OSCILLATOR OUTPUT RATES

OSCILLATOR FREQUENCY = 1.536 MHZ

COUNTER SETTING DECIMAL	HEXADECIMAL	BINARY	DIVIDE RATIO	OUTPUT RATE - KHZ LINE	SPEECH
252	FC	11111100	4	48.000	96.000
253	FD	11111101	3	64.000	128.000
254	FE	11111110	2	96.000	192.000
255	FF	11111111	1	192.000	384.000

TABLE 3-19: REAL TIME CLOCK CONTROL (CONT'D)

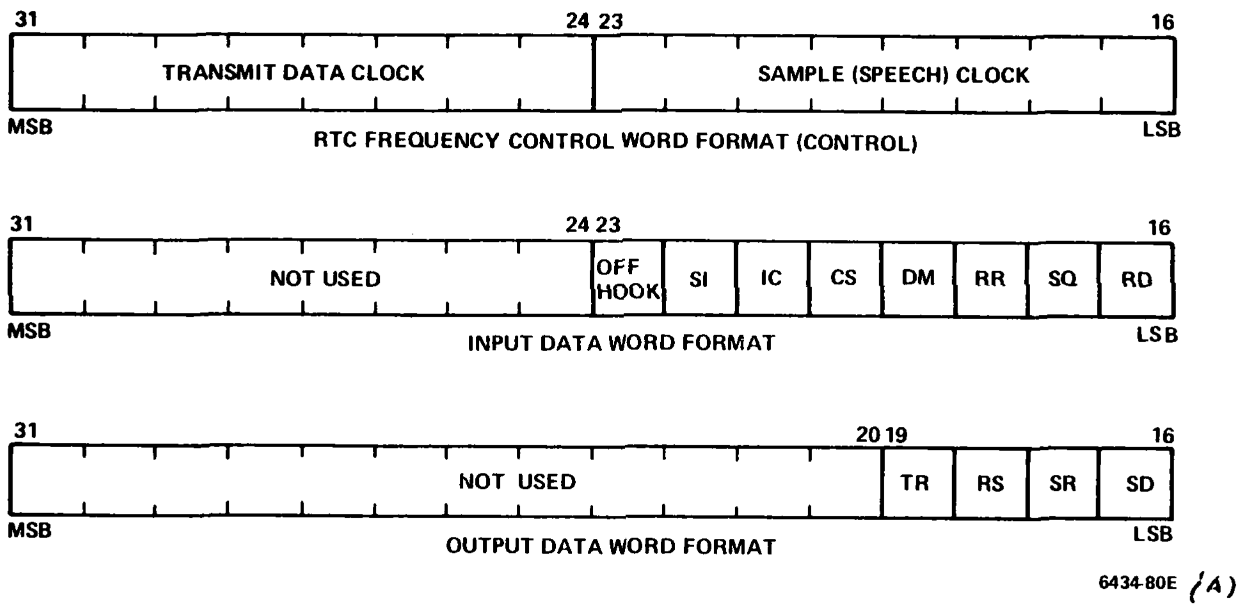


FIGURE 3-31: FDI FORMATS

Data transfers between the MAP-300 and the modem take place via the IOS-2SM data bus. The data transfer process is interrupt driven, with timing based on the transmit data clock, for output transfers, and the modem receiver clock, for input transfers. The interrupts will, therefore, occur at the data rate, thereby allowing sufficient time for the IOS-2SM to acknowledge each interrupt and perform the appropriate data transfer. The interrupts are controlled by a two-phase clock such that simultaneous interrupts can never occur. Furthermore, the interrupts are mutually exclusive so that the IOS-2SM can receive only one interrupt at a time. Interrupt number 1 is used for receive data, and interrupt number 2 is used for transmit data.

Upon receiving interrupt number 1, the processor should perform an input data transfer, acknowledging the interrupt after the transfer is complete. The input data word will contain the current modem data sample (least significant bit), RS-449 interface status data (bits 17-22), and a hookswitch status bit (bit 23). The receive interrupts are timed by the modem receive data clock; hence, the maximum response time to input the data and acknowledge the interrupt is approximately one-half of a period at the modem data rate. (The one-half period results from the fact that the processor must also supply transmit data.)

Upon receiving interrupt number 2, the processor should perform an output data transfer, acknowledging the interrupt after the transfer is complete. The output data word must contain the next data bit in the least significant bit position, and the appropriate RS-449 interface control bits in bit positions 17-19. The transmit interrupts are timed by the transmit data clock; hence, the maximum response time to output the data and acknowledge the interrupt is approximately one-half of a

period at the transmit data rate. In order to insure the correct timing of the transmit data at the modem interface, the output data is double buffered. Hence, while the MAP-300 is transferring transmit data bit n, data bit n-1 appears at the modem interface.

The audio interface has been tested according to the attached table. These tests insure that all amplifiers and filters are performing to the designed specifications. The loop tests performed for both the handset and tape audio paths insure that the entire audio interface functions properly with the MAP-300, and that the overall loop gains and frequency response requirements are met.

The real time clock portion of the modified IOS-2SM scroll has been tested by programming several different line and speech sampling rates. A sufficient number of possible rates have been programmed to insure proper functioning of all RTC control bits. The modem interface has been tested by first outputting various control and data bit patterns from the MPA-300, and insuring that the correct bit patterns appear at the modem interface connector. Once the output had been determined to function properly, the modem input was tested by inputting various control and data bit patterns, looping through the MAP-300, and observing the bit patterns at the interface connector. A digital loop test was performed in which the MAP-300 output a digital data stream which was looped back at the modem interface connector and fed back into the processor where the resulting input was compared to the original output.

3.4.2.3 Modifications on Map Analog I/O Hardware

Due to the fact that the Map Analog circuitry is located in a very noisy environment (with the switching power supplies and the digital

circuitry nearby), noise reduction techniques are very important in order to reduce the background noise in the presence of a signal. The modifications listed below were found necessary to reduce the background noise to ± 1 LSB of a 12 bit A/D converter operating at 5V full scale. The noise reduction techniques consisted of the reducing ground loops, separating ground and signal ground, and the reconfiguring the sample and hold amplifier with a differential input to reject common mode noise. It was observed that a good air circulation was required to reduce the terminal drift of the components in the analog circuitry.

List of Modifications on Map Analog I/O Hardware

1. ADAM Board
   a. Added decoupling capacitors between ± 15V and ground at the A/D, S/H, and MUX
   b. Cut ground etch to eliminate ground loops on analog circuit (around S/A and Hold capacitor)
   c. Added ground from A/D to S/H directly.
   d. Converted S/H to differential input. As a result, signal inputs are on Pin 28 (signal +) and Pin 29 (signal -) instead of Pin 34 and Pin 36. (Note: Only S/H designated as #4 on schematic has been modified.)

2. AOM Board
   a. Cut ground etch from I/O pin 15 and 16 and added ground wire directly from D/A (pin 21) to I/O pin 15 and 16.
   b. D/A cable modified. Wires to connector P4 pin 7 (purple) and pin 8 (black) have been removed to separate I/O drawer ground from AOM board ground.

3.5 System Usage

This section describes the operating instructions for executing the GTE system and for generating it. The examples in this section will use MAP A. Changes required for MAPs B and C are noted when not apparent.

Three steps are necessary for running the ATC system once it has been generated. First, the MAP must be allocated and loaded with the required programs as follows:

```
>ALL MA:
>

>RUN MALD
OBJECT INPUT?
BINARY INPUT?GTE.BG
      --  STOP
>
```

Second, the task must be installed as follows:

```
>INS ATCA
>
```

Third, the ATC task must be run, as follows:

```
>RUN ATCA
>
```

```
             >>>>> GTE 9600 BPS ATC SYSTEM <<<<<

START-UP(Y/N)? Y
           (1) MAP OPENED AND BUFFERS DECLARED!
           (2) PRE-BOUND FUNCTIONS CREATED!
           (3) FUNCTION LISTS DEFINED!
           (4) IOS-2 SETUP COMPLETE!
           (5) ADM SETUP COMPLETE!
           (6) ADAM SETUP COMPLETE!


PDP <==> MAP LINKAGE HAS BEEN SUSPENDED
   (DATE AND TIME)
TYPE "RES ATCA" TO TERMINATE
```

The file LINE.PBJ must be available for proper execution. The task starts MAP A and then suspends itself. To halt the ATC system, the task must be resumed as follows:

```
RES ATCA
>
ATCA  --  STOP
>
```

When resumed, the task closes the MAP and exits.

If a complete, two MAP system is desired, the process above must be repeated for the second MAP.

If the ATC system is to be started again, without additional loading of GTE.BO, the start-up procedure can be avoided by answering "N" to the "Start-up" question, as follows:

```
>RUN ATCA
>



              >>>>> GTE 9600 BPS ATC SYSTEM <<<<<

START-UP(Y/N)? N
            (1) MAP OPENED AND BUFFERS DECLARED!
            (2) PRE-BOUND FUNCTIONS CREATED!
            (3) FUNCTION LISTS DEFINED!
            (4) IOS-2 SETUP COMPLETE!
            (5) AOM SETUP COMPLETE!
            (6) ADAM SETUP COMPLETE!


PDP <==> MAP LINKAGE HAS BEEN SUSPENDED
   (DATE AND TIME)
TYPE "RES ATCA" TO TERMINATE
```

3.5.1 System Generation

The ATC system generation consists of generating the MAP load module and of generating the ATCA, ATCB, and ATCC tasks.

3.5.1.1 MAP Load Module Generation

The process of generating a MAP load module consists of four steps. For purposes of illustration, the array function VMOV1 will be used in the example to follow.

First, the source file, VMOV1.TXT must be reformatted using PREMAP, as follows:

```
>RUN PREMAP
INPUT FILENAME= VMOV1.TXT
OUTPUT FILENAME= VMOV1.MAP
NORMAL EXIT AFTER NNN LINES!

      --  STOP
>
```

VMOV1.MAP is the reformatted source file, acceptable to the MAP assembler. Instructions for building the PREMAP tasks are included in Section 3.5.2.2.

Second, the reformatted source file must be assembled as follows:

```
>RUN MAPASM
SOURCE FILENAME?
VMOV1.MAP
OBJECT FILENAME?
VMOV1.OBJ
LISTING OUTPUT?
VMOV1.LST
 O:
$1,9999

LINES WITH ERRORS:    0   (MAP VERSION 800101.10)   E=    0
>
```

Third, all of the PBJ modules must be combined into a single PBJ file. This can be accomplished by using the command file GTESYS.CMD as follows:

```
@GTESYS
PIP MAP.PBJ;*/DE
PIP GTE.PBJ;*/DE
PIP GTE.BU;*/DE
PIP MAP.PBJ=S300EX.PBJ,APDONE.PBJ,GTE300.PBJ,FF2R.PBJ,IOS.PBJ
PIP GTE.PBJ=MAP.PBJ,MPEDVM.PBJ,MPDCTM.PBJ,MPQDPP.PBJ,MPDQPP.PBJ
PIP GTE.PBJ=GTE.PBJ,MPMWGX.PBJ,MPESTV.PBJ,MPASRT.PBJ,MESSRT.PBJ
PIP GTE.PBJ=GTE.PBJ,MPESTQ.PBJ,MPESTD.PBJ,MPBASP.PBJ,MPSCAN.PBJ
PIP GTE.PBJ=GTE.PBJ,MPCDBA.PBJ,MPIDCM.PBJ,MPVDNM.PBJ,GPATCH.PBJ
PIP GTE.PBJ=GTE.PBJ,VMOV1.PBJ,VMOV2.PBJ,VMOV3.PBJ,CSPUTS.PBJ
PIP GTE.PBJ/PU
;
;        USE MACRO ONCE!
;        1<N(CR)FFFF(CR)S-1LSKSTS>SS
;
;        USE MACRO 23 TIMES!
;        23<NFFFF   SOLS2KTS>SS
;
TEC GTE.PBJ
*1<N
FFFF
S-1LSKSTS>SS
10'      APSDONE     AP PROCESS INTERRUPT HANDLER      MAY 28,1980
23<NFFFF   SOLS2KTS>SS
10*  SNAP-II MAP-300 ARITH. MODULES - PROG #830101.03 MAY 7, 1980
10;FAST FOURIER TRANSFORM AND INVERSE TRANSFORM ALGORITHMS          18 AUG
10'   SNAP-II IOS PACKAGE  ---- JUNE 25, 1979 ----  PROGRAM # 840001.00
10'?FCB 241... "MPDCTM(Y,U,V,W)"?FORM TRUE DCT AND ITS REFLECTED MAG SQU
10'?FCB 242... "MPQDPP(Y,U,V)"?QUANTIZE/DEQUANTIZE SIDEBAND
10'?FCB 243... "MPDQPP(Y,U,V)"?DEQUANTIZE SIDEBAND
10'?FCB 244... "MPMWGX(Y,U,V,W)"?EXTRACT M,PG,MOVE X
10'?FCB 245... "MPESTV(U)"?CREATE PITCH AND VOCAL TRACT RESPONSE
10'?FCB 249... "MPASRT(U)"?SORT DCT1(.) COEFFICIENTS
10'?FCB 247... "MPSSRT(Y)"?SORT DCT1(.) COEFFICIENTS
10'?FCB 250... "MPESTQ(Y,U,V,W)"?QUANTIZE DCT PARAMETERS
10'?FCB 251... "MPESTD(Y,U,V,W)"?DEQUANTIZE DCT PARAMETERS
10'?FCB 253... "MPBASP(Y,U,V,W)"?BASIS SPECTRUMCALCULATION
10'?FCB 254... "MPSCAN(Y,U,V)"?SCAN DCT BASIS SPECTRUM
10'?FCB 255... "MPCDBA(Y,U,V)"?COMPLETE DCT BIT ASSIGNMENT
10'?FCB 248... "MPIDCM(Y,U,V)"?MAKHOUL IDCT CORRECTION
10'?FCB 252... "MPVDNM(Y,U,V)"?VAR.,DC,INTERPOLATE,FIX
10         #L=$7A1D
10'?FCB 237... "VMOV1(Y)"?MOVE BUNCH OF BUFFERS TO OTHER BUFFERS
10'?FCB 238... "VMOV2(Y)"?MOVE BUNCH OF BUFFERS TO OTHER BUFFERS
10'?FCB 239."VMOV3(Y)"?MOVE BUNCH OF BUFFERS TO OTHER
10'?PROG. CSPUSP.TXT
*
*EXSS
PIP GTE.PBJ/PU
MPL
MCR -- TASK NOT IN SYSTEM
>
```

Note that once the command file has invoked TECO, the user must give the specified TECO commands. The PREMAP and assembly procedures must be repeated for each of the files used in GTESYS.CMD. If the file 5300EX.PBJ is unavailable, it must be obtained from the delivered tape, as assembly is not possible. In addition, the procedure must be performed on LINE.TXT if LINE.PBJ does not exist.

Fourth, the file GTE.PBJ must be transformed by the MAP Loader into a binary object file, as follows:

```
>RUN MALD
OBJECT INPUT?GTE.PBJ
BINARY OUTPUT?GTE.BO
LOAD MAP? (Y OR N) N
        -- STOP 2
>
```

The file GTE.BO is then ready for use.

3.5.1.2 Task Generation

The command files ATCA.CMD and TBATCA.CMD are used to build the ATC task. When taskbuilding the ATC tasks, it is necessary, for reasons of space, to use the GTE-supplied RSX system library, F4PLIB.OLB. The existing system library, SYSLIB.OLB, should be renamed to something else, e.g., OSYSLIB.OLB, and F4PLIB.OLB should be renamed to SYSLIB.OLB. The file ATCA.ODL is used to specify the overlay structure. The contents of ATCA.CMD are:

```
TIM
TKB @TBATCA
TIM
```

The contents of TBATCA are:

```
ATCA=ATCA/*P
UNITS=10
ASG=TI:7
ASG=NI:5
ASG=SY:4
//
```

The contents of ATCA.ODL are:

```
        .ROOT A-*(B,C,D,K,H,I,W,E,F,G,J,L,M,O,P,R,S,T,T0,U,U0,Y,Z,Z0,Z2,Z3)
A:      .FCTR MASTER-USNPA
B:      .FCTR INIT
C:      .FCTR USER
D:      .FCTR MAPUG
K:      .FCTR CREATE
H:      .FCTR DEFLDB-IO/LB
I:      .FCTR SETUP-(LOAD,IOSM-IO/LB,AOM-IO/LB,ADAM-IO/LB)
W:      .FCTR SYSTMA-IO/LB
E:      .FCTR INPUT-TAPE2-(OPT1,OPT2,OPT3,OPT4,OPT5,OPT6,OPT7,OPT8A)
F:      .FCTR DCVAR
G:      .FCTR DCTF
J:      .FCTR QOPARM
M:      .FCTR PITLPC
L:      .FCTR VPBS
O:      .FCTR BASIS
P:      .FCTR ASRT
R:      .FCTR SPCT
S:      .FCTR BITA
T:      .FCTR ODCT
T0:     .FCTR CHANL
U:      .FCTR LPARM
U0:     .FCTR SSET
Y:      .FCTR DDCT
Z:      .FCTR OCTR
Z0:     .FCTR VARDC
Z2:     .FCTR OUTPUT-TAPE2-(OPT1,OPT2,OPT3,OPT4,OPT5,OPT6,OPT7,OPT8A)
Z3:     .FCTR SNR
        .END
```

ATCA.ODL requires a particular host support library, NSNPA, which has the unused array functions deleted. The command file to create this library is AGTESN.CMD. Its contents are

```
TIM
;
;       CREATE SEPARATE VERSION OF "SNPLIB.OLB"
;
PIP NSNPA.OLB=SNALB.OLB
;
;       ADD ATC HSP ROUTINES
;
LBR NSNPA/IN=FF2RHSP
LBR NSNPA/IN=MPFDVM,MPDCTM,MPMWGX,MPQDPP,MPFSTV,MPHASP,MPASRT
LBR NSNPA/IN=MPSCAM,MPCDHA,MPFSTG,MPLGPP,MPSSRT,MPFSTD,MPIDCM,MPVDNM
;
;       DELETE UNUSED "COMPLEX FCH" HSP ROUTINES
;
LBR SY:NSNPA/DE:CCVML:CMINV:CPOL:CRECT:CSQRT:CSMA1:CSMA2:CVADD
LBR SY:NSNPA/DE:CVCMJ:CVMUL:CVRCP:CVSUB:CXMLR:CXMUL
;
;       DELETE UNUSED "ARITHMETIC FCH" HSP ROUTINES
;
LBR SY:NSNPA/DE:SOUT:SMAX:SMIN:SMVAR:SMXAB:SSMAB:SSMSQ:SADD:SSUB
LBR NSNPA/IN=VMOV1,VMOV2,VMOV3
LBR SY:NSNPA/DE:DCVM:DDIFF:DFL22:DINIG:DPRF
LBR NSNPA/DE:NVLD:SDIV:SMUL:SSUM:VSMA1:VTHR
LBR SY:NSNPA/DE:FFIR3:FFT:FFTI:FFTIF:FFTI3:FFIR:FFIR3:FFT3:FFINR:FFTNR
LBR SY:NSNPA/DE:VALGH:VALN:VHIST:VLN:VRAMP:VRAN1:VSMA2:VSMA3
LBR SY:NSNPA/DE:VMAX:VMIN:VMINS:VA:VAB:VABSQ:VAD
LBR SY:NSNPA/DE:VALOG:VAL2:VCLIP:VCOMP:VDIV:VDV:VFIX8:VFLT8
LBR SY:NSNPA/DE:VFRCT:VFTI:VINPT:VITF:VLG16:VLIM:VLOG:VLOGH
LBR SY:NSNPA/DE:VL2:VMAG:VMG:VMGSQ:VML:VMNAB:VMSQ:VMTHR:VMUL
LBR SY:NSNPA/DE:VMXAB:VNEG:VPOLY:VPOW:VRC:VRCP:VS:VSAD:VSB
LBR SY:NSNPA/DE:VSINT:VSML:VSQ:VSQRT:VSSQ:VTAG:VXP
;
;       DELETE UNUSED "MANAGEMENT FCH" HSP ROUTINES
;
LBR SY:NSNPA/DE:MPCLM:MPCOL:MPNXC:MPNXR:MPRUN:MPRSA:MPRSI:MPABT
LBR NSNPA/DE:MPCLA:MPCRB:MPFTM:MPFOR:MPTLB
LBR NSNPA/DE:MPCSQ:MPAPA:MPCSE:MPTSS:MPWIC:MPRBC:MPLIM:MPMUL
LBR NSNPA/DE:MPIAD:MPICS:MPIDV:MPIF:MPICL:MPIFR:MPIFX
LBR NSNPA/DE:MPIMD:MPIML:MPIRS:MPISB:MPITM:MPITF:MPITS:MPIWL:MPIWS
LBR NSNPA/DE:MPBFI:MPBFO:MPDHB:MPFHA:MPRBS:MPSCB:MPSRB
LBR NSNPA/DE:MPTSB:MPTBS:MPWBA:MPFVN:MPUDD:MPWTS
;
;       EXTRACT AS AN OBJECT FOR ROOT SEGMENT
;
LBR SY:NSNPA=NSNPA/EX
PIP NSNPA.OBJ/LI
PIP NSNPA.*/PU
TIM
```

The library NSNPA is based on the library SNALB, which contains the GTE-delivered version of FCBGN, as well as SNAPHX, EAFHSP, MRTPCK, and MAADVR.

If it is necessary to compile the Fortran files, three command files are provided for this purpose. GTEFTN.CMD compiles the host support modules for the GTE-written array functions. Its contents are:

```
F4P VMOV1,LP/LI:1=VMOV1/DE/NOTR
F4P VMOV2,LP/LI:1=VMOV2/DE/NOTR
F4P VMOV3,LP/LI:1=VMOV3/DE/NOTR
F4P MPFDVM,LP/LI:1=MPFDVM/DE/NOTR
F4P MPFCTM,LP/LI:1=MPFCTM/DE/NOTR
F4P MPGDPP,LP/LI:1=MPGDPP/DE/NOTR
F4P MPDQPP,LP/LI:1=MPDQPP/DE/NOTR
F4P MPMAGX,LP/LI:1=MPMAGX/DE/NOTR
F4P MPFSTV,LP/LI:1=MPFSTV/DE/NOTR
F4P MPSSRT,LP/LI:1=MPSSRT/DE/NOTR
F4P MPIDCM,LP/LI:1=MPIDCM/DE/NOTR
F4P MPASRT,LP/LI:1=MPASRT/DE/NOTR
F4P MPFSTQ,LP/LI:1=MPFSTQ/DE/NOTR
F4P MPFSTD,LP/LI:1=MPFSTD/DE/NOTR
F4P MPVDNM,LP/LI:1=MPVDNM/DE/NOTR
F4P MPBASP,LP/LI:1=MPBASP/DE/NOTR
F4P MPSCAN,LP/LI:1=MPSCAN/DE/NOTR
F4P MPCDRA,LP/LI:1=MPCDRA/DE/NOTR
```

CFTN.CMD compules most of the modules in the Fortran control program. The delivered version is incorrect and must be modified to correspond to the following:

```
F4P MASTER=MASTER.ATC/NOTR
F4P INIT=INIT/DE/NOTR
F4P USER=USER/DE/NOTR
F4P MAPON=MAPON/DE/NOTR
F4P CREATE=CREATE/DE/NOTR
F4P DEFINE=DEFINE/DE/NOTR
F4P SETUP=SETUP/DE/NOTR
F4P LOAD=LOAD/NOTR
F4P IOSM=IOSM/NOTR
F4P ADM=ADM/NOTR
F4P ADAM=ADAM/NOTR
F4P SYSTMB=SYSTMB/DE/NOTR
F4P SYSTMC=SYSTMC/DE/NOTR
F4P SYSTMA=SYSTMA/DE/NOTR
F4P INPUT=INPUT/DE/NOTR
F4P DCVAR=DCVAR/DE/NOTR
F4P DCTF=DCTF/DE/NOTR
F4P PITLPC=PITLPC/DE/NOTR
F4P QDPARM=QDPARM/DE/NOTR
F4P VPES=VPES/DE/NOTR
F4P BASIS=BASIS/DE/NOTR
F4P ASRT=ASRT/DE/NOTR
F4P SDCT=SDCT/DE/NOTR
F4P BITA=BITA/DE/NOTR
F4P QDCT=QDCT/DE/NOTR
F4P CHANL=CHANL/DE/NOTR
F4P DPARM=DPARM/DE/NOTR
F4P SSRT=SSRT/DE/NOTR
F4P DDCT=DDCT/DE/NOTR
F4P DCTR=DCTR/DE/NOTR
F4P VARDC=VARDC/DE/NOTR
F4P OUTPUT=OUTPUT/DE/NOTR
F4P SWR=SWR/DE/NOTR
```

The command file TAPFTN.CMD compiles the remaining files needed by the Fortran control program. Its contents must be modified to conform to the following:

```
F4P TAPE2=TAPE2/NOTR
F4P OPT1=OPT1/NOTR
F4P OPT2=OPT2/NOTR
F4P OPT3=OPT3/NOTR
F4P OPT4=OPT4/NOTR
F4P OPT5=OPT5/NOTR
F4P OPT6=OPT6/NOTR
F4P OPT7=OPT7/NOTR
F4P OPT8=OPT8/NOTR
F4P OPT8A=OPT8A/NOTR
F4P OPT8B=OPT8B/NOTR
F4P OPT8C=OPT8C/NOTR
```

A command file for generating PREMAP is also provided. The contents of PREMAP.CMD are:

```
FOR SY:PREMAP,LP/LI:1=SY:PREMAP
TKB SY:PREMAP,LP=SY:PREMAP,FILES
PIP PREMAP.*/PU
```

3.6 System Listings

The ATC system listings which follow are divided into three sections: MAP Functions, Executive Programs, and Fortran Host Support, Control, and Support Programs.

3.6.1 MAP Functions

The modules contained in this section are:

VMOV1

VMOV2

VMOV3

MPFDVM

MPDCTM

MPQDPP

MPDQPP

MPMWGX

MPFSTV

MPSSRT

MPIDCM

MPASRT

MPFSTQ

MPFSTD

MPVDNM

GPATCH

MPBASP

MPSCAN

MPCDBA

LINE

```
               (00001) *  FCH 237..."VMOV1(Y)"    MOVE BUNCH OF BUFFERS TO OTHER BUFFERS
               (00002) *                                       ORIGINATED: 12-MAY-80
               (00003) *                                       UPDATED: 20-JUL-80
               (00004) *
               (00005) *  MOVE FROM        TO
               (00006) *  QPRM             AQPR
               (00007) *  QTDCT1           AQTDCT
               (00008) *  QTDCTM           QTDCT1
               (00009) *  MIBI14           AIBIT4
               (00010) *  MIBIT3           MIBIT4
               (00011) *  INPR             NINM
               (00012) *
               (00013) *  DEFINE GLOBAL SYMBOLS
      000008F8 (00014)         AFDTSORG=$8F8
      000021FC (00015)         CSPUSNOS=$21FC
      00000794 (00016)         DMYS=$794
      00000003 (00017)         #M=3
      00000000 (00018)         MSS=0
      00000502 (00019)         ISVTS=$0502
      00000503 (00020)         ISAS001=ISVTS+D'1'
      0000056C (00021)         ISAS106=ISVTS+D'106'
      00000575 (00022)         ISAS115=ISVTS+D'115'
      00002E28 (00023)         QPRMS=11816
      00002B28 (00024)         QTDCT1S=11048
      00000B34 (00025)         QTDCTMS=2868
      00002D28 (00026)         MIBIT4S=11560
      00002C28 (00027)         MIBIT3S=11304
      00008D80 (00028)         INPRS=36224
      00008A00 (00029)         AQPRS=35328
      00008A0E (00030)         AQTDCTS=35342
      00008B0E (00031)         AIBIT4S=35598
      00000C34 (00032)         NINMS=3124
               (00033) *
      0000639C (00034)         START=25500
               (00035) *
               (00036) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
      00000876 (00037)         #L=AFDTSORG+3*2*(237-128)                  FCH 237
00876 001E639E (00038)         ADDR VMV1S(R7,1)
00878 001E63B2 (00039)         ADDR VMV11S(R7,1)
0087A 001021FC (00040)         ADDR CSPUSNOS(,1,0)
               (00041)         EJECT
```

```
              0000639C (00042)             #L=START
                       (00043) #>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<
                       (00044) *
                       (00045)             EVEN
        0639C 0000     (00046)             DATA VMV1SSA
        0639D 0006     (00047)             DATA VMV1SSZ
                       (00048) VMV1S       BEGIN APU(VMV1)
              00000000 (00049)             #A=0
    A00 0639F 20460000 (00050) VMV1SSA SET(G2)\NOP                          START TIMING OF ANALYZER
    A01 063A0 08FC0000 (00051) #1          MOV(IQA,OQ)\NOP
    A02 063A2 90100001 (00052)             JUMPC(#1,F1)
                       (00053) *
    A03 063A4 20322032 (00054)             CLEAR(RA)
    A04 063A6 00000000 (00055)             NOP
    A05 063A8 10000000 (00056)             JUMP(0)
              00000006 (00057)             VMV1SSZ=#A-VMV1SSA
        063AA          (00058)             END VMV1SSZ
                       (00059)             EJECT
```

```
                       (00060) *>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<
                       (00061) *
                       (00062)         EVEN
     063AA 0000642A    (00063)         ADDR VMV1S1
     063AC 000063B4    (00064)         ADDR VMV1IS+2*SCLRS
     063AE 0000        (00065)         DATA 0
     063AF 007A        (00066)         DATA VMV1SZ
     063B0 000063FF    (00067)         ADDR VMV1SA
                       (00068)         EVEN
                       (00069) *
                       (00070) VMV1IS  BEGIN APS(VMV1I)
A00  063B2 00201P40    (00071)         JSN(VMV10S,P2)
A01  063B4 02300030    (00072) SCLRS   SET(R0)                                 ENABLE OUTPUT
A02  063B6 04C42F28    (00073)         LOAD(BR0,QPRMS(2),TF)
A03  063B8 06500005    (00074)         LOAD(BR1,5)
A04  063BA 08BA0002    (00075) #1      ADD(BR0,2,TF)
A05  063BC 0A1904B1    (00076)         SUBL(BR1,1),JUMPP(#1)                   QPRM IN
A06  063BE 0CC42B28    (00077)         LOAD(BR0,QTDCT1S(2),TF)
A07  063C0 0E50007E    (00078)         LOAD(BR1,126)
A08  063C2 10BA0002    (00079) #2      ADD(BR0,2,TF)
A09  063C4 121908B1    (00080)         SUBL(BR1,1),JUMPP(#2)                   QTDCT1 IN
                       (00081)
A0A  063C6 14C42D28    (00082)         LOAD(BR0,MIBIT4S(2),TF)
A0B  063C8 1650007E    (00083)         LOAD(BR1,126)
A0C  063CA 18BA0002    (00084) #4      ADD(BR0,2,TF)
A0D  063CC 1A190CB1    (00085)         SUBL(BR1,1),JUMPP(#4)                   MIBIT4 IN
A0E  063CE 1CC2BDB0    (00086)         LOAD(BR0,INPBS(1),TF)
A0F  063D0 1E500079    (00087)         LOAD(BR1,121)                           123*2 HALFWORDS
A10  063D2 20BA0002    (00088) #6      ADD(BR0,2,TF)
A11  063D4 221910B1    (00089)         SUBL(BR1,1),JUMPP(#6)                   INPB IN
A12  063D6 24C40B34    (00090)         LOAD(BR0,QTDCTMS(2),TF)
A13  063D8 2650007E    (00091)         LOAD(BR1,126)
A14  063DA 28BA0002    (00092) #3      ADD(BR0,2,TF)
A15  063DC 2A1914B1    (00093)         SUBL(BR1,1),JUMPP(#3)                   QTDCTM IN
A16  063DE 2CC42C28    (00094)         LOAD(BR0,MIBIT3S(2),TF)
A17  063E0 2E50007E    (00095)         LOAD(BR1,126)
A18  063E2 30BA0002    (00096) #5      ADD(BR0,2,TF)
A19  063E4 321918B1    (00097)         SUBL(BR1,1),JUMPP(#5)                   MIBIT3 IN
A1A  063E6 35420503    (00098) INPST   LOAD(BR0,ISAS001(1),TF)                 IO=1
                       (00099) *
A1B  063E8 36200031    (00100) DNEST   CLEAR(R1)
A1C  063EA 38000020    (00101)         NOP(0)
                       (00102) *
A1D  063EC 3A300032    (00103) VMV10S  SET(RA)
```

```
A1E 063EE 3C500000 (00104)         LOAD(RW1,E01)                 DUMMY FOR EXEC
A1F 063F0 3E500000 (00105)         LOAD(RW1,MSS)                 DUMMY
A20 063F2 40500000 (00106)         LOAD(RW1,MSS)
A21 063F4 42C2BA00 (00107)         LOAD(RW0,AOPHS(1),TF)
A22 063F6 44500005 (00108)         LOAD(RW1,5)
A23 063F8 46RA0002 (00109) #1      ADD(RW0,2,TF)
A24 063FA 48112381 (00110)         SUBL(RW1,1),JUMPP(#1)         AOPH OUT
A25 063FC 4AC2BA0F (00111)         LOAD(RW0,AQTDCTS(1),TF)
A26 063FE 4C50007E (00112)         LOAD(RW1,126)
A27 06400 4ERA0002 (00113) #2      ADD(RW0,2,TF)
A28 06402 50112781 (00114)         SUBL(RW1,1),JUMPP(#2)         AQTDCT OUT
A29 06404 52C2BB0F (00115)         LOAD(RW0,AIBIT4S(1),TF)
A2A 06406 5450007E (00116)         LOAD(RW1,126)
A2B 06408 56RA0002 (00117) #4      ADD(RW0,2,TF)
A2C 0640A 58112B81 (00118)         SUBL(RW1,1),JUMPP(#4)         AIBIT4 OUT
A2D 0640C 5AC40C34 (00119)         LOAD(RW0,NINMS(2),TF)
A2E 0640E 5C500079 (00120)         LOAD(RW1,121)                 123*2 HALFWORDS
A2F 06410 5ERA0002 (00121) #6      ADD(RW0,2,TF)
A30 06412 60112F81 (00122)         SUBL(RW1,1),JUMPP(#6)         NINM OUT
A31 06414 62C42B2B (00123)         LOAD(RW0,QTDCT1S(2),TF)
A32 06416 6450007E (00124)         LOAD(RW1,126)
A33 06418 66RA0002 (00125) #3      ADD(RW0,2,TF)
A34 0641A 68113381 (00126)         SUBL(RW1,1),JUMPP(#3)         QTDCT1 OUT
A35 0641C 6AC42D2B (00127)         LOAD(RW0,MIBIT4S(2),TF)
A36 0641E 6C50007E (00128)         LOAD(RW1,126)
A37 06420 6ERA0002 (00129) #5      ADD(RW0,2,TF)
A38 06422 70113781 (00130)         SUBL(RW1,1),JUMPP(#5)         MIBIT4 OUT
                   (00131) *
                   (00132) *
A39 06424 73420575 (00133) INPSO   LOAD(RW0,ISAS115(1),TE)       SET XGO
                   (00134) *
A3A 06426 74200030 (00135) DNESO   CLEAR(R0)
A3B 06428 76000020 (00136)         NOP(0)
          000063FF (00137)         VMV1SA=*C
    0642A          (00138)         END #A-1
                   (00139) *STORAGE BLOCK FOR CONSTRUCTED INSTRUCTION
    0642A 00000000 (00140) VMV1SI  DATA 1F'0,0'
          0000007A (00141)         VMV1SZ=*L-VMV1IS
    0642C          (00142)         END
```

```
AFDTSORG:   00EFB (00014) (00037)
AIBIT4S:    0B80F (00031) (00115)
AOPRS:      0BA00 (00029) (00107)
AOTDCTS:    0BA0F (00030) (00111)
CSPUSNDS:   021FC (00015) (00040)
DMYS:       00794 (00016)
DNFSI:      0001B (00100)
DNFSO:      0003A (00135)
INFSI:      0001A (00098)
INPSO:      00039 (00133)
INPRS:      0BD80 (00028) (00086)
ISAS001:    00503 (00020) (00098)
ISAS106:    0056C (00021)
ISAS115:    00575 (00022) (00133)
ISVTS:      00502 (00019) (00020) (00021) (00022)
MSS:        00000 (00018) (00105) (00106)
MIBIT3S:    02C28 (00027) (00094)
MIBIT4S:    02D28 (00026) (00082) (00127)
NINMS:      00C34 (00032) (00119)
OPRMS:      02F28 (00023) (00073)
OTDCT1S:    02B28 (00024) (00077) (00123)
OTDCTMS:    00B34 (00025) (00090)
SCLRS:      00001 (00064) (00072)
START:      0639C (00034) (00042)
VMVIS:      0639F (00038) (00048)
VMVISA:     063EF (00067) (00137)
VMVISI:     0642A (00063) (00140)
VMVISSA:    00000 (00046) (00050) (00057)
VMVISSZ:    00006 (00047) (00057) (00058)
VMVISZ:     0007A (00066) (00141)
VMVIIS:     063B2 (00039) (00064) (00070) (00141)
VMVIOS:     0001D (00071) (00103)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E=    0
```

```
                  (00001) *  FCB 23B..."VMOV2(Y)"    MOVE BUNCH OF BUFFERS TO OTHER BUFFERS
                  (00002) *                                    ORIGINATED:13-MAY-80
                  (00003) *                                    UPDATED: 20-JUL-80
                  (00004) *
                  (00005) *  MOVE FROM        TO
                  (00006) *  ARQPB            ORPRM
                  (00007) *  ARQDCT           ORDCTM
                  (00008) *  MIBIT1           MIBIT2
                  (00009) *  IORDR1           IORDR2
                  (00010) *  DCTIT1           DCTIT2
                  (00011) *  NOUT             OUTB
                  (00012) ** AND SCALAR PAIRS:
                  (00013) *  VAR,DC           OVAR,ODC
                  (00014) *
                  (00015) *  DEFINE GLOBAL SYMBOLS
         000008EB (00016)        AFDTSORG=$8EB
         000021FC (00017)        CSPUSNOS=$21FC
         00000794 (00018)        DMYS=$794
         00000502 (00019)        ISVTS=$502
         00000503 (00020)        ISAS001=ISVTS+D'1'
         0000056A (00021)        ISAS104=ISVTS+D'104'
         00000571 (00022)        ISAS111=ISVTS+D'111'
         00000574 (00023)        ISAS114=ISVTS+D'114'
         00000576 (00024)        ISAS116=ISVTS+D'116'
         00000003 (00025)        #M=3
         00000000 (00026)        MSS=0
         00000382 (00027)        SVTS=$0382
         0000044A (00028)        SAS100=SVTS+2*D'100'
         0000044C (00029)        SAS101=SVTS+2*D'101'
         0000044E (00030)        SAS102=SVTS+2*D'102'
         00000450 (00031)        SAS103=SVTS+2*D'103'
         000096B6 (00032)        ARQPBS=38582
         000096C4 (00033)        ARQDCTS=38596
         00002928 (00034)        MIBIT1S=10536
         00002728 (00035)        IORDR1S=10024
         00002328 (00036)        DCTIT1S=9000
         00000F16 (00037)        NOUTS=3862
         00002E36 (00038)        ORPRMS=11830
         00002E44 (00039)        ORDCTMS=11844
         00002A28 (00040)        MIBIT2S=10792
         00002828 (00041)        IORDR2S=10280
         00002528 (00042)        DCTIT2S=9512
         00009444 (00043)        OUTBS=37956
                  (00044) *
```

```
          00006450 (00045)         START=$6450
                   (00046) *
                   (00047) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
          00000B7C (00048)         #L=AFDISORG+3*2*(238-128)                    FCB 238
00B7C 001F6452 (00049)         ADDR VMV2$(R7,1)
00B7E 001F6464 (00050)         ADDR VMV21$(R7,1)
00B80 001021FC (00051)         ADDR CSPU$NOS(,1,0)
                   (00052)         EJECT
```

```
              00006450 (00053)          #L=START
                       (00054) #>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<
                       (00055) #
                       (00056)          EVEN
          06450 0000   (00057)          DATA VMV2$SA
          06451 0005   (00058)          DATA VMV2$SZ
                       (00059) VMV2S    BEGIN APU(VMV2)
              00000000 (00060)          #A=0
      A00 06452 081C0000 (00061) VMV2$SA MOV(ZERO,DD)\NOP                    CLEAR RG02
      A01 06454 08FC0000 (00062) #1      MOV(IOA,DD)\NOP
      A02 06456 901D0001 (00063)         JUMPC(#1,F1)
                       (00064) #
      A03 06458 20322032 (00065) DNESA   CLEAR(RA)
      A04 0645A 00000000 (00066)         NOP
              00000005 (00067)          VMV2$SZ=#A-VMV2$SA
          0645C        (00068)          END VMV2$SZ
                       (00069)          EJECT
```

```
                          (00070) *>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<
                          (00071) *
                          (00072)         EVEN
    0645C 000064FA (00073)         ADDR VMV2SI
    0645E 00006466 (00074)         ADDR VMV21S+2*SCLRS
    06460 0000     (00075)         DATA 0
    06461 0088     (00076)         DATA VMV2SZ
    06462 000064A6 (00077)         ADDR VMV2SA
                          (00078)         EVEN
                          (00079) *
                          (00080) VMV21S  BEGIN APS(VMV21)
A00 06464 00202040 (00081)         JSN(VMV20S,P2)
A01 06466 02300030 (00082) SCLRS   SET(R0)                          ENABLE OUTPUT
A02 06468 04C296B6 (00083)         LOAD(BR0,AROPRS(1),TF)
A03 0646A 06500005 (00084)         LOAD(BR1,5)
A04 0646C 08BA0002 (00085) #1      ADD(BR0,2,TF)
A05 0646E 0A1904B1 (00086)         SUBL(BR1,1),JUMPP(#1)            OPRM IN
A06 06470 0CC296C4 (00087)         LOAD(BR0,ARODCTS(1),TF)
A07 06472 0E50007E (00088)         LOAD(BR1,126)
A08 06474 10BA0002 (00089) #2      ADD(BR0,2,TF)
A09 06476 121908B1 (00090)         SUBL(BR1,1),JUMPP(#2)            QTDCT1 IN
A0A 06478 14C4292B (00091)         LOAD(BR0,MIBIT1S(2),TF)
A0B 0647A 1650007E (00092)         LOAD(BR1,126)
A0C 0647C 18BA0002 (00093) #3      ADD(BR0,2,TF)
A0D 0647E 1A190CB1 (00094)         SUBL(BR1,1),JUMPP(#3)            QTDCTM IN
A0E 06480 1CC4272B (00095)         LOAD(BR0,IORDR1S(2),TF)
A0F 06482 1E50007E (00096)         LOAD(BR1,126)
A10 06484 20BA0002 (00097) #4      ADD(BR0,2,TF)
A11 06486 221910B1 (00098)         SUBL(BR1,1),JUMPP(#4)            MIBIT4 IN
A12 06488 24C4232B (00099)         LOAD(BR0,DCT1T1S(2),TF)
A13 0648A 265000FF (00100)         LOAD(BR1,254)                    REAL
A14 0648C 28BA0002 (00101) #5      ADD(BR0,2,TF)
A15 0648E 2A1914B1 (00102)         SUBL(BR1,1),JUMPP(#5)            MIBIT3 IN
A16 06490 2CC40E16 (00103)         LOAD(BR0,NOUTS(2),TF)
A17 06492 2E500079 (00104)         LOAD(BR1,121)                    123*2 HALFWORDS
A18 06494 30BA0002 (00105) #6      ADD(BR0,2,TF)
A19 06496 321918B1 (00106)         SUBL(BR1,1),JUMPP(#6)            INPB IN
A1A 06498 34C2044F (00107)         LOAD(BR0,SAS102(1),TF)
A1B 0649A 36C20450 (00108)         LOAD(BR0,SAS103(1),TF)
A1C 0649C 39420503 (00109)         LOAD(BR0,ISAS001(1),TF)          IQ=1
A1D 0649E 3B0A0000 (00110)         ADD(BR0,0,TF)                    AND AGAIN
                          (00111) *
A1E 064A0 3C200031 (00112) DNEST   CLEAR(RI)
A1F 064A2 3E000020 (00113)         NOP(0)
```

```
                         (00114) *  OUTPUT PGM
 A20 064A4 40300032 (00115) VMV20S  SET(RA)
 A21 064A6 42500000 (00116)         LOAD(BW1,101)                      DUMMY OP FOR EXEC
 A22 064A8 44500000 (00117)         LOAD(BW1,MSS)
 A23 064AA 46500000 (00118)         LOAD(BW1,MSS)
 A24 064AC 49420576 (00119)         LOAD(BW0,ISAS116(1),TE)            CLEAR RG02
 A25 064AE 4AC42F36 (00120)         LOAD(BW0,ORPRMS(2),TE)
 A26 064B0 4C500005 (00121)         LOAD(BW1,5)
 A27 064B2 4EBA0002 (00122) #1      ADD(BW0,2,TE)
 A28 064B4 501127B1 (00123)         SUBL(BW1,1),JUMPP(#1)              AQPB OUT
 A29 064B6 52C42E44 (00124)         LOAD(BW0,QRDCTMS(2),TE)
 A2A 064B8 5450007F (00125)         LOAD(BW1,126)
 A2B 064BA 56BA0002 (00126) #2      ADD(BW0,2,TE)
 A2C 064BC 581128B1 (00127)         SUBL(BW1,1),JUMPP(#2)              AQTDCT OUT
                         (00128) *
                         (00129) *
 A2D 064BE 5AC42A2B (00130)         LOAD(BW0,MIBIT2S(2),TE)
 A2E 064C0 5C50007F (00131)         LOAD(BW1,126)
 A2F 064C2 5EBA0002 (00132) #3      ADD(BW0,2,TE)
 A30 064C4 60112EB1 (00133)         SUBL(BW1,1),JUMPP(#3)              QTDCT1 OUT
 A31 064C6 62C42B2B (00134)         LOAD(BW0,IORDR2S(2),TE)
 A32 064C8 6450007F (00135)         LOAD(BW1,126)
 A33 064CA 66BA0002 (00136) #4      ADD(BW0,2,TE)
 A34 064CC 681133B1 (00137)         SUBL(BW1,1),JUMPP(#4)              AIBIT4 OUT
 A35 064CE 6AC42528 (00138)         LOAD(BW0,DCT1T2S(2),TE)
 A36 064D0 6C5000FE (00139)         LOAD(BW1,254)
 A37 064D2 6EBA0002 (00140) #5      ADD(BW0,2,TE)
 A38 064D4 701137B1 (00141)         SUBL(BW1,1),JUMPP(#5)              MIBIT4 OUT
 A39 064D6 72C29444 (00142)         LOAD(BW0,OUTBS(1),TE)
 A3A 064D8 74500079 (00143)         LOAD(BW1,121)                      123*2 HALFWORDS
 A3B 064DA 76BA0002 (00144) #6      ADD(BW0,2,TE)
 A3C 064DC 7B113BB1 (00145)         SUBL(BW1,1),JUMPP(#6)              NINM OUT
 A3D 064DE 7AC2044A (00146)         LOAD(BW0,SAS100(1),TE)
 A3E 064E0 7CC2044C (00147)         LOAD(BW0,SAS101(1),TE)
 A3F 064E2 7E420574 (00148)         LOAD(BW0,ISAS114(1),TE)            SET RG0
 A40 064E4 81420571 (00149)         LOAD(BW0,ISAS111(1),TE)            SET OUTFUL
                         (00150) *
 A41 064E6 82200030 (00151) DNESD   CLEAR(R0)
 A42 064E8 84000020 (00152)         NOP(0)
           000064A6 (00153)         VMV2SA=#C
     064EA          (00154)         END #A-1
                         (00155) *STORAGE BLOCK FOR CONSTRUCTED INSTRUCTION
     064EA 00000000 (00156) VMV2S1  DATA 1E'0,0'
           00000088 (00157)         VMV2SZ=#L-VMV21S
```

```
064EC          (00158)        END
```

```
AFDTSORG:   008F8 (00016) (00048)
AROPCTS:    096C4 (00033) (00087)
AROPHS:     096F6 (00032) (00083)
CSPHSNOS:   021FC (00017) (00051)
DCT1T1S:    02328 (00036) (00099)
DCT1T2S:    02528 (00042) (00138)
DMYS:       00794 (00018)
DNFSA:      00003 (00065)
DNFSI:      0001F (00112)
DNFSO:      00041 (00151)
IORDR1S:    02728 (00035) (00095)
IORDR2S:    02828 (00041) (00134)
ISAS001:    00503 (00020) (00109)
ISAS104:    0056A (00021)
ISAS111:    00571 (00022) (00149)
ISAS114:    00574 (00023) (00148)
ISAS116:    00576 (00024) (00119)
ISVTS:      00502 (00019) (00020) (00021) (00022) (00023) (00024)
MSS:        00000 (00026) (00117) (00118)
MIBIT1S:    02928 (00034) (00091)
MIBIT2S:    02A28 (00040) (00130)
NOUTS:      00F16 (00037) (00103)
OUTHS:      09444 (00043) (00142)
ORPCTMS:    02F44 (00039) (00124)
ORPHMS:     02F36 (00038) (00120)
SAS100:     0044A (00028) (00146)
SAS101:     0044C (00029) (00147)
SAS102:     0041F (00030) (00107)
SAS103:     00450 (00031) (00108)
SCLRS:      00001 (00074) (00082)
START:      06450 (00045) (00053)
SVTS:       00382 (00027) (00028) (00029) (00030) (00031)
VMV2S:      06452 (00049) (00059)
VMV2SA:     064A6 (00077) (00153)
VMV2SI:     064FA (00073) (00156)
VMV2SSA:    00000 (00057) (00061) (00067)
VMV2SSZ:    00005 (00058) (00067) (00068)
VMV2SZ:     0008B (00076) (00157)
VMV2IS:     06464 (00050) (00074) (00080) (00157)
VMV2OS:     00020 (00081) (00115)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)    F=    0
```

```
                    (00001) *  FCR 239,"VMOV3(Y)"      MOVE BUNCH OF BUFFERS TO OTHER
                    (00002) *                                  BUFFERS.
                    (00003) *                                  ORIGINATED: 13-MAY-80
                    (00004) *                                  UPDATED: 01-JUL-80
                    (00005) *
                    (00006) *  MOVE FROM        TO
                    (00007) *  MIBIT1           RIBIT1
                    (00008) *  TMP4             DCT1T1
                    (00009) *  IORDRM           IORDR1
                    (00010) ** AND SCALAR PAIRS:
                    (00011) *  NVAR,NDC                 VAR,DC
                    (00012) *
                    (00013) *  DEFINE GLOBAL SYMBOLS
          00000BEB  (00014)        AFDTSORG=$BEB
          000021FC  (00015)        CSPUSNOS=$21FC
          00000794  (00016)        DMYS=$794
          00000003  (00017)        #M=3
          00000000  (00018)        MSS=0
          00000382  (00019)        SVTS=$0382
          00000432  (00020)        SAS88=SVTS+2*D'88'
          00000434  (00021)        SAS89=SVTS+2*D'89'
          0000044E  (00022)        SAS102=SVTS+2*D'102'
          00000450  (00023)        SAS103=SVTS+2*D'103'
          00000502  (00024)        ISVTS=$0502
          00000503  (00025)        ISAS1=ISVTS+D'1'                      UNITY
          00000576  (00026)        ISAS116=ISVTS+D'116'                  RG02
          00000828  (00027)        MIBITS=2088
          00000C00  (00028)        TMP4S=3072
          00000000  (00029)        IORDRMS=0
          00009AA6  (00030)        RIBITS=39590
          00002328  (00031)        DCT1T1S=9000
          00002728  (00032)        IORDR1S=10024
          00002928  (00033)        MIBIT1S=10536
                    (00034) *
          00006500  (00035)        START=$6500
                    (00036) *
                    (00037) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
          00000B82  (00038)        #L=AFDTSORG+3*2*(239-128)             FCR 239
    00B82 001E6502  (00039)        ADDR VMV3S(R7,1)
    00B84 001E6516  (00040)        ADDR VMV31S(R7,1)
    00B86 001021FC  (00041)        ADDR CSPUSNOS(,1,0)
                    (00042)        EJECT
```

```
             00006500 (00043)          #L=START
                      (00044) *>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<
                      (00045) *
                      (00046)          EVEN
    06500 0000        (00047)          DATA VMV3$SA
    06501 0006        (00048)          DATA VMV3$SZ
                      (00049) VMV3$    BEGIN APU(VMV3)
          00000000    (00050)          #A=0
A00 06502 00000000    (00051) VMV3$SA  NOP
A01 06504 08FC0000    (00052) #2       MOV(IOA,DO)\NOP
A02 06506 901D0001    (00053)          JUMPC(#2,F1)
A03 06508 20322032    (00054)          CLEAR(RA)
A04 0650A 00000000    (00055)          NOP
A05 0650C 10000000    (00056)          JUMP(0)
          00000006    (00057)          VMV3$SZ=#A-VMV3$SA
    0650F             (00058)          END VMV3$SZ
                      (00059)          EJECT
```

```
                        (00060) *>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<
                        (00061) *
                        (00062)          EVEN
    0650F 0000656B      (00063)          ADDR VMV3ST
    06510 00006518      (00064)          ADDR VMV3TS+2*SCLRS
    06512 0000          (00065)          DATA 0
    06513 0054          (00066)          DATA VMV3SZ
    06514 00006540      (00067)          ADDR VMV3SA
                        (00068)          EVEN
                        (00069) *
                        (00070) VMV3TS   BEGIN APS(VMV3T)
A00 06516 00201440      (00071)          JSR(VMV30S,P2)
A01 06518 02300030      (00072) SCLRS    SET(R0)                              ENABLE OUTPUT
A02 0651A 04C42928      (00073)          LOAD(BR0,MIBIT1S(2),TF).
A03 0651C 0650007D      (00074)          LOAD(BR1,125)
A04 0651E 08BA0002      (00075) #1       ADD(BR0,2,TF)
A05 06520 0A190481      (00076)          SUBL(BR1,1),JUMPP(#1)                MIBIT IN
A06 06522 0CBA0002      (00077)          ADD(BR0,2,TF)
A07 06524 0FC50C00      (00078)          LOAD(BR0,TMP4S(3),TF)
A08 06526 105000FE      (00079)          LOAD(BR1,254)
A09 06528 12BA0002      (00080) #2       ADD(BR0,2,TF)
A0A 0652A 141909B1      (00081)          SUBL(BR1,1),JUMPP(#2)                TMP4 IN
A0B 0652C 16C60000      (00082)          LOAD(BR0,IORDRMS(3),TF)
A0C 0652E 1B50007E      (00083)          LOAD(BR1,126)
A0D 06530 1ABA0002      (00084) #3       ADD(BR0,2,TF)
A0E 06532 1C1900B1      (00085)          SUBL(BR1,1),JUMPP(#3)                IORDRM IN
A0F 06534 1EC20432      (00086)          LOAD(BR0,SASB8(1),TF)
A10 06536 20C20434      (00087)          LOAD(BR0,SASB9(1),TF)
A11 06538 23420503      (00088)          LOAD(BR0,ISAS1(1),TF)                UNITY FOR RG02
A12 0653A 24200031      (00089)          CLEAR(RI)
A13 0653C 26000020      (00090)          NOP(0)
                        (00091) *  OUTPUT PGM
A14 0653E 28300032      (00092) VMV30S   SET(RA)
A15 06540 2A500000      (00093)          LOAD(BW1,(0))                        DUMMY OP FOR EXEC
A16 06542 2C500000      (00094)          LOAD(BW1,MSS)
A17 06544 2E500000      (00095)          LOAD(BW1,MSS)
A18 06546 30C29AA6      (00096)          LOAD(BW0,RIBITS(1),TF)
A19 06548 3250007E      (00097)          LOAD(BW1,126)
A1A 0654A 34BA0002      (00098) #1       ADD(BW0,2,TF)
A1B 0654C 36111AB1      (00099)          SUBL(BW1,1),JUMPP(#1)                RIBIT,MIBIT1 OUT
A1C 0654E 38C42328      (00100)          LOAD(BW0,DCT1T1S(2),TF)
A1D 06550 3A5000FE      (00101)          LOAD(BW1,254)
A1E 06552 3CBA0002      (00102) #2       ADD(BW0,2,TF)
A1F 06554 3E111EB1      (00103)          SUBL(BW1,1),JUMPP(#2)                DCT1T1 OUT
```

```
A20 06556 40C4272B (00104)          LOAD(BW0,IORDR1S(2),TF)
A21 06558 4250007F (00105)          LOAD(BW1,126)
A22 0655A 448A0002 (00106) #3       ADD(BW0,2,TF)
A23 0655C 461122B1 (00107)          SUBL(BW1,1),JUMPP(#3)          IORDR1 OUT
A24 0655E 4BC2044F (00108)          LOAD(BW0,SAS102(1),TF)
A25 06560 4AC20450 (00109)          LOAD(BW0,SAS103(1),TF)
A26 06562 4D420576 (00110)          LOAD(BW0,ISAS116(1),TF)        SET RG02 TO LET CSPU CON
                   (00111) ;                                            TINUE
A27 06564 4F200030 (00112)          CLEAR(R0)
A28 06566 50000020 (00113)          NOP(0)
          00006540 (00114)          VMV3SA=#C
    06568          (00115)          END #A-1
                   (00116) *STORAGE BLOCK FOR CONSTRUCTED INSTRUCTION
    06568 00000000 (00117) VMV3ST  DATA 1F'0,0'
          00000054 (00118)          VMV3SZ=#L-VMV31S
    0656A          (00119)          END
```

```
AFDT$ORG:  008EE (00014) (00038)
CSPUSNOS:  021FC (00015) (00041)
DCT1T1$:   02328 (00031) (00100)
DMYS:      00794 (00016)
IORDR1$:   02728 (00032) (00104)
IORDRM$:   00000 (00029) (00082)
ISAS1:     00503 (00025) (00088)
ISAS116:   00576 (00026) (00110)
ISVTS:     00502 (00024) (00025) (00026)
MSS:       00000 (00018) (00094) (00095)
MIBITS:    00828 (00027)
MIBIT1S:   02928 (00033) (00073)
RIBITS:    09AA6 (00030) (00096)
SAS102:    0044F (00022) (00108)
SAS103:    00450 (00023) (00109)
SAS88:     00432 (00020) (00086)
SAS89:     00434 (00021) (00087)
SCLES:     00001 (00064) (00072)
START:     06500 (00035) (00043)
SVTS:      00382 (00019) (00020) (00021) (00022) (00023)
TMP4S:     00C00 (00028) (00078)
VMV3S:     06502 (00039) (00049)
VMV3SA:    06540 (00067) (00114)
VMV3S1:    06568 (00063) (00117)
VMV3SSA:   00000 (00047) (00051) (00057)
VMV3SSZ:   00006 (00048) (00057) (00058)
VMV3SZ:    00054 (00066) (00118)
VMV31S:    06516 (00040) (00064) (00070) (00118)
VMV30S:    00014 (00071) (00092)

LINES WITH ERRORS:    0  (MAP VERSION 800101,10)   E=    0
```

```
                     * FCH 240... "MPFDVM(Y,U,V)"      FLOAT,DCBIAS,VAR,REFLECT INPUT VIA MAKHOUL ALG.
                     *                                 ORIGINATED:06-OCT-79
                     *                                 UPDATED:10-JUL-80
                     * DEFINE GLOBAL SYMBOLS
                             OPADD EXP,(1 .LS. 14)+(12 .LS. 8)+$1F
                             OPADD DOF,(3 .LS. 10) + (12 .LS. 5) + $1B
         00000BFB            AFDTSORG=$BFB
         000021FC            CSPUSNOS=$21FC
         00000794            DHYS=$794
         00000003            #M=3
         00000001            HS=1
         00000000            MSS=0
         00000014            KP2S=2*D'10'
         00000502            ISVTS=$502
         0000057F            ISAS125=ISVTS+D'125'           INFULL
         00000570            ISAS110=ISVTS+D'110'
         00000382            SVTS=$0382
         000003D0            SAS39=SVTS+2*D'39'
         000003FA            SAS52=SVTS+2*D'52'
         000003FE            SAS54=SVTS+2*D'54'
         000003F0            SAS55=SVTS+2*D'55'
         0000043C            SAS93=SVTS+2*D'93'
         0000043E            SAS94=SVTS+2*D'94'
         00000440            SAS95=SVTS+2*D'95'
         00008600            START=$8600
         00000002            WS=2
         00000004            WWS=4
         00000003            ZS=3
                     *
                     * EXPAND ARRAY FUNCTION DISPATCH TABLE
         00000BBB            #L=AFDTSORG+3*2*(240-128)      FCH 240
   0OBBB 001FB620            ADDR FDVS(R7,1)
   0OBBA 001FB7B6            ADDR G200S(R7,1)
   0OBBC 001021FC            ADDR CSPUSNOS(,1,0)
                             EJECT
```

```
                    (00036) *
                    (00037) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00038) *
           00008600 (00039)         #L=START
                    (00040)         EVEN
                    (00041) *  SPECIAL CONSTANTS
                    (00042) *
08600 4000          (00043) ILOGS1  DATA $4000                              128
08601 0042          (00044)         DATA $0042
08602 2000          (00045)         DATA $2000                              64
08603 0042          (00046)         DATA $0042
08604 CA77          (00047)         DATA $CA77                              C8
08605 68C0          (00048)         DATA $68C0
08606 0949          (00049) ILOGS2  DATA $0949                              C3
08607 5742          (00050)         DATA $5742
08608 D00F          (00051)         DATA $D00F                              C2
08609 58C1          (00052)         DATA $58C1
0860A 0800          (00053)         DATA $0800                              16**4
0860B 0045          (00054)         DATA $0045
0860C 1FB5          (00055)         DATA $1FB5                              C7
0860D 5541          (00056)         DATA $5541
0860E 209E          (00057)         DATA $209F                              C1
0860F AB41          (00058)         DATA $AB41
08610 DFCC          (00059)         DATA $DFCC                              C6
08611 BF41          (00060)         DATA $BF41
08612 88D9          (00061)         DATA $88D9                              C0
08613 D0C1          (00062)         DATA $D0C1
08614 0ABE          (00063)         DATA $0ABE                              C5
08615 57C2          (00064)         DATA $57C2
08616 8C07          (00065)         DATA $8C07                              C4
08617 18C2          (00066)         DATA $18C2
                    (00067) *
08618 4000          (00068) ISORS1  DATA $4000                              0.5
08619 0040          (00069)         DATA $0040
0861A 0800          (00070)         DATA $0800                              16**7
0861B 0048          (00071)         DATA $0048
0861C 1000          (00072)         DATA $1000                              2.0
0861D 0041          (00073)         DATA $0041
                    (00074)         EJECT
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                  (00075) *
                  (00076) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                  (00077) *
                  (00078)              EVEN
    0861F 0000    (00079)              DATA FDVSSA                                  START ADDRESS
    0861F 00C7    (00080)              DATA FDVSSZ                                  MODULE SIZE
                  (00081) FDVS         BEGIN APU(FDV)
       00000000   (00082)              #A=0
A00 08620 00000000 (00083) FDVSSA      NOP                                          <<<<<FOR TIMING
A01 08622 081C0000 (00084)             MOV(ZERO,00)\NOP                             <<<<<CALLING CARD=0
                  (00085) *  INCLUDE UPDATE SAMPLES IN SUM, THEN FLOAT NEW SAMPLES, OUTPUT,
                  (00086) *        AND INCLUDE IN SUM
A02 08624 08100810 (00087)             MOV(ZERO,A0)                                 SUM
A03 08626 02000200 (00088)             R(A0)
A04 08628 08FF08FF (00089)             MOV(IQA,M7)                                  SA = 2**15
A05 0862A 08FF08FF (00090)             MOV(IQA,M6)                                  SB = 1/LTH
A06 0862C 08F10890 (00091) FLSM1       MOV(IQA,A1)\MOV(R,A0)
A07 0862F 089008F1 (00092)             MOV(R,A0)\MOV(IQA,A1)
A08 08630 41004100 (00093)             ADD(A0,A1)
A09 08632 90160006 (00094)             JUMPC(FLSM1,FW1)                             INCLUDE UPDATE SAMPLES I
                  (00095) ;                                                         N SUM
A0A 08634 20372037 (00096)             CLEAR(W1)
A0B 08636 08110811 (00097)             MOV(ZERO,A1)                                 FAKE FOR FIRST ADD
A0C 08638 1000000F (00098)             JUMP(FLSM2)                                  AVOID FAKE OUTPUTS
A0D 0863A 08810881 (00099) FLTSM       MOV(P,A1)
A0E 0863C 08BC08BC (00100)             MOV(P,00)
A0F 0863F 08F20890 (00101) FLSM2       MOV(IQA,A2)\MOV(R,A0)                        X\SUM
A10 08640 089008F2 (00102)             MOV(R,A0)\MOV(IQA,A2)                        SUM\X
A11 08642 32403240 (00103)             NORM(A2)                                     FLOAT X
A12 08644 41084108 (00104)             MOV(M0),ADD(A0,A1)                           FLOAT X,SUM OF X FROM LA
                  (00105) ;                                                         ST TIME THRU
A13 08646 84608460 (00106)             MUL(M0,M7)                                   FLOAT X*2**15
A14 08648 9016000D (00107)             JUMPC(FLTSM,FW1)
A15 0864A 08810881 (00108)             MOV(P,A1)
A16 0864C 08BC08BC (00109)             MOV(P,00)
A17 0864E 41104110 (00110)             MOV(A0),ADD(A0,A1)                           ADD LAST TERM INTO SUM
A18 08650 20372037 (00111)             CLEAR(W1)                                    GIVE APS LOTS OF TIME FO
                  (00112) ;                                                         R NEXT INPUTS
A19 08652 08900898 (00113)             MOV(R,A0)\MOV(R,FX0)                         LEFT SUM\RIGHT SUM
A1A 08654 08510000 (00114)             MOV(FX1,A1)\NOP                              RIGHT SUM
A1B 08656 41000000 (00115)             ADD(A0,A1)\NOP                               LEFT SUM + RIGHT SUM
A1C 08658 08880888 (00116)             MOV(R,M0)                                    SUM
A1D 0865A 84408440 (00117)             MUL(M0,M6)                                   SUM*1/LTH
A1E 0865C 08BC0000 (00118)             MOV(P,00)\NOP                                DCBIAS
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A1F 0865E 08880000 (00119)         MOV(P,EX0)\NOP
A20 08660 08870857 (00120)         MOV(P,A7)\MOV(FX1,A7)              DCBIAS
                   (00121) *
                   (00122) *X'=X-DCBIAS,SUM(X')^2 FOR VARIANCE
A21 08662 08120812 (00123) VSQS    MOV(ZERO,A2)                       ZERO SUM
A22 08664 02400240 (00124)         R(A2)                              GET 0 IN R
A23 08666 10000025 (00125)         JUMP(SQ2)                          SKIP FAKE PRODUCTS
A24 08668 08820882 (00126) SQ1     MOV(P,A2)
A25 0866A 08F10890 (00127) SQ2     MOV(IQA,A1)\MOV(R,A0)              X\SUM,ZERO FIRST TIME
A26 0866C 08900BF1 (00128)         MOV(R,A0)\MOV(IQA,A1)              SUM,ZERO FIRST TIME\X
A27 0866E 4F204F20 (00129)         SUB(A1,A7)                         X-BIAS
A28 08670 08880888 (00130)         MOV(R,M0)
A29 08672 088C088C (00131)         MOV(R,M4)                          PREPARE TO SQUARE
A2A 08674 84008400 (00132)         MUL(M0,M4)                         SQUARE
A2B 08676 421C421C (00133)         MOV(OQ),ADD(A0,A2)                 OUTPUT X-BIAS,ADD IN SQU
                   (00134) ;                                          ARE FROM LAST TIME
A2C 08678 90160024 (00135)         JUMPC(SQ1,FW1)
A2D 0867A 08820882 (00136)         MOV(P,A2)                          LAST SQUARE
A2E 0867C 08900890 (00137)         MOV(R,A0)                          SUM FROM LOOP
A2F 0867E 42004200 (00138)         ADD(A0,A2)                         ADD IN LAST SQUARE
A30 08680 08900898 (00139)         MOV(R,A0)\MOV(R,EX0)               LEFT SUM\RIGHT SUM
A31 08682 08520000 (00140)         MOV(FX1,A2)\NOP                    RIGHT SUM
A32 08684 42000000 (00141)         ADD(A0,A2)\NOP                     LEFT SUM + RIGHT SUM
A33 08686 08880000 (00142)         MOV(R,M0)\NOP
A34 08688 84400000 (00143)         MUL(M0,M6)\NOP                     SUM/LTH
A35 0868A 088C0000 (00144)         MOV(P,GQ)\NOP                      VAR^2=SD
A36 0868C 90180036 (00145) #1      JUMPC(#1,OQE)                      WAIT FOR SD TO BE WRITTE
                   (00146) ;                                          N
A37 0868E 20372037 (00147)         CLEAR(WI)                          THEN LET INPUT GO
A38 08690 00000000 (00148)         NOP
                   (00149) *
                   (00150) *  VAR=SQRT(SD)
A39 08692 08D70000 (00151) SSQRTS  MOV(IQ,A7)\NOP                     A7=$40000040
A3A 08694 08EF0000 (00152)         MOV(IQA,M7)\NOP                    M7=0.5
A3B 08696 08F60000 (00153)         MOV(IQA,A6)\NOP                    A6=16**7
A3C 08698 08F50000 (00154)         MOV(IQA,A5)\NOP                    A5=2.0
A3D 0869A 08F20000 (00155)         MOV(IQA,A2)\NOP                    A2=X(0,K)
A3E 0869C 08F00000 (00156)         MOV(IQA,A0)\NOP                    A0=X(1,K)
A3F 0869E 12400000 (00157)         ABS(A2)\NOP                        ABS(X(0,K))
A40 086A0 12080000 (00158)         MOV(M0),ABS(A0)\NOP                M0=ABS(X(0,K)),X(2,K)
A41 086A2 08900000 (00159)         MOV(R,A0)\NOP                      A0=X(2,K)
A42 086A4 4F000000 (00160)         SUB(A0,A7)\NOP                     X(3,K)
A43 086A6 088A0000 (00161)         MOV(R,M2)\NOP                      M2=X(3,K)
A44 086A8 85600000 (00162)         MUL(M2,M7)\NOP                     X(4,K)
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A45 086AA 02C00000 (00163)          R(A6)\NOP                          X(5)
A46 086AC 08800000 (00164)          MOV(P,A0)\NOP                      A0=X(4,K)
A47 086AE 47140000 (00165)          MOV(A4),ADD(A0,A7)\NOP             A4=X(5),X(6,K)
A48 086B0 1F100000 (00166)          MOV(A0),EXP(A0)\NOP                A0=X(6,K),X(7,K)
A49 086B2 08A0000 (00167)           MOV(R,M2)\NOP                      M2=X(7,K)
A4A 086B4 08900000 (00168)          MOV(P,A0)\NOP                      A0=X(7,K)
A4B 086B6 2F000000 (00169) #2       RCP(A0)\NOP                        X(8,K)
A4C 086B8 08C0000 (00170)           MOV(R,M4)\NOP                      M4=X(8,K)
A4D 086BA 85000000 (00171)          MUL(M2,M4)\NOP                     X(9,K)
A4E 086BC 08820000 (00172)          MOV(P,A2)\NOP                      A2=X(9,K)
A4F 086BE 4AA00000 (00173)          SUB(A5,A2)\NOP                     X(10,K)
A50 086C0 08A0000 (00174)           MOV(R,M2)\NOP                      M2=X(10,K)
A51 086C2 85000000 (00175)          MUL(M2,M4)\NOP                     X(11,K)
A52 086C4 02000000 (00176)          R(A0)\NOP                          GET X(7,K)
A53 086C6 08AC0000 (00177)          MOV(P,M4)\NOP                      M4=X(11,K)
A54 086C8 08A0000 (00178)           MOV(R,M2)\NOP                      M2=X(7,K)
A55 086CA 85000000 (00179)          MUL(M2,M4)\NOP                     X(12,K)
A56 086CC 08820000 (00180)          MOV(P,A2)\NOP                      A2=X(12,K)
A57 086CE 4AA00000 (00181)          SUB(A5,A2)\NOP                     X(13,K)
A58 086D0 08A0000 (00182)           MOV(R,M2)\NOP                      M2=X(13,K)
A59 086D2 85000000 (00183)          MUL(M2,M4)\NOP                     X(14,K)
A5A 086D4 08AC0000 (00184)          MOV(P,M4)\NOP                      M4=X(14,K)
A5B 086D6 84000000 (00185)          MUL(M0,M4)\NOP                     X(15,K)
A5C 086D8 08820000 (00186)          MOV(P,A2)\NOP                      A2=X(15,K)
A5D 086DA 42000000 (00187)          ADD(A0,A2)\NOP                     X(16,K)
A5E 086DC 08A0000 (00188)           MOV(R,M2)\NOP                      M2=X(16,K)
A5F 086DE 85600000 (00189)          MUL(M2,M3)\NOP                     X(7,K)
A60 086E0 2A800000 (00190)          DECRE(A4)\NOP                      X(5)
A61 086E2 08800000 (00191)          MOV(P,A0)\NOP                      A0=X(7,K)
A62 086E4 08AA0000 (00192)          MOV(P,M2)\NOP                      M2=X(7,K)
A63 086E6 08940000 (00193)          MOV(R,A4)\NOP                      A4=X(5)
A64 086E8 901F004B (00194)          JUMPC(#2,T1)                       DONE YET?
A65 086EA 02000000 (00195)          R(A0)\NOP                          YES!
A66 086EC 089C0000 (00196)          MOV(R,D0)\NOP                      VAR=SORT(SD)
A67 086EE 20372037 (00197)          CLEAR(WI)                          RELEASE APS INPUT
                   (00198) *
                   (00199) *  VAR'=1.0/VAR
A68 086F0 08F0000 (00200) SINVS     MOV(R,M6)\NOP                      M6=SC=VAR
A69 086F2 08900000 (00201)          MOV(R,A0)\NOP                      A0=SC=VAR
A6A 086F4 16A016A0 (00202)          K(2)                               R=2.0;R=2.0
A6B 086F6 08960000 (00203)          MOV(R,A6)\NOP                      A6=2
A6C 086F8 2F000000 (00204)          RCP(A0)\NOP                        R1=1/C+DEL(=F0)
A6D 086FA 08880000 (00205)          MOV(R,M0)\NOP                      M0=F0
A6E 086FC 84400000 (00206)          MUL(M0,M6)\NOP                     P1=F0*C
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A6F 086FF 08B10000 (00207)         MOV(P,A1)\NOP                A1=F0*C
A70 08700 49C00000 (00208)         SUB(A6,A1)\NOP               R2=2-F0*C
A71 08702 08BC0000 (00209)         MOV(R,M4)\NOP                M4=R2
A72 08704 84000000 (00210)         MUL(M0,M3)\NOP               P2=F0*R2(=F1)
A73 08706 08A80000 (00211)         MOV(P,M0)\NOP                M0=F1
A74 08708 84400000 (00212)         MUL(M0,M6)\NOP               P3=F1*C
A75 0870A 08B10000 (00213)         MOV(P,A1)\NOP                A1=P3
A76 0870C 49C00000 (00214)         SUB(A6,A1)\NOP               R3=2-F1*C
A77 0870E 08BC0000 (00215)         MOV(R,M4)\NOP                M4=R3
A78 08710 84000000 (00216)         MUL(M0,M4)\NOP               P4=F1*(2-F1*C)(=F2)
A79 08712 08BC0000 (00217)         MOV(P,00)\NOP                00=SA=1.0/VAR
A7A 08714 08B80000 (00218)         MOV(P,FX0)\NOP               FX0=SA=1.0/VAR
                   (00219) *
                   (00220) *  MAPX(I)=MAPX(I)*VAR'    I=0,1,2...LTH-1
                   (00221) *  ALSO DO MAKHOUL REFLECTION V(K)=X(2K),V(N-K-1)=X(2K+1)
A7B 08716 08AF084F (00222) VMULS   MOV(P,M7)\MOV(FXI,M7)        1.0/VAR
A7C 08718 08F80000 (00223) #1      MOV(IOA,M0)\NOP              X
A7D 0871A 000008F8 (00224)         NOP\MOV(IOA,M0)              X
A7E 0871C 84608460 (00225)         MUL(M0,M7)                   V*VAR'
A7F 0871E 08BC081C (00226)         MOV(P,00)\MOV(ZERO,00)       XR,XI (EVEN)
A80 08720 081C08BC (00227)         MOV(ZERO,00)\MOV(P,00)       XI,XR (ODD)
A81 08722 9016007C (00228)         JUMPC(#1,FWI)
A82 08724 20372037 (00229)         CLEAR(WI)
A83 08726 00000000 (00230)         NOP
                   (00231)
                   (00232) *  VAR''=ALOG10(VAR)
A84 08728 08EF0000 (00233) SLOGS   MOV(IOA,M6)\NOP              M6=SA=ALOG16(10.0)
A85 0872A 08FA0000 (00234)         MOV(IOA,M2)\NOP              M2=128
A86 0872C 08F70000 (00235)         MOV(IOA,A7)\NOP              A7=64
A87 0872E 08FF0000 (00236)         MOV(IOA,M7)\NOP              M7=C8
A88 08730 08D20000 (00237)         MOV(IO,A2)\NOP               A2=X(0,K)
A89 08732 08FD0000 (00238)         MOV(IOA,M5)\NOP              M5=X(0,K)
A8A 08734 26400000 (00239)         RCB(A2)\NOP                  X(1,K)
A8B 08736 08F10000 (00240) #1      MOV(IOA,A1)\NOP              A1=X(3,K)
A8C 08738 26290000 (00241)         MOV(M1),RCB(A1)\NOP          M1=X(1,K),X(4,K)
A8D 0873A 84B30000 (00242)         MOV(A3),MUL(M1,M5)\NOP       A3=X(18,K-1),X(2,K)
A8E 0873C 08F20000 (00243)         MOV(IOA,A2)\NOP              A2=X(5,K)
A8F 0873E 45710000 (00244)         MOV(A1),ADD(A3,A5)\NOP       A1=X(4,K),X(19,K-1)
A90 08740 124C0000 (00245)         MOV(M4),ABS(A2)\NOP          M4=X(19,K-1),X(8,K)
A91 08742 08B50000 (00246)         MOV(P,A5)\NOP                A5=X(2,K)
A92 08744 85880000 (00247)         MOV(M0),MUL(M3,M4)\NOP       M0=X(2,K),X(20,K-1)
A93 08746 2A2D0000 (00248)         MOV(M5),DECRF(A1)\NOP        M5=X(8,K),X(6,K)
A94 08748 08F20000 (00249)         MOV(IOA,A2)\NOP              A2=C3
A95 0874A 0F310000 (00250)         MOV(A1),LGS(A1)\NOP          A1=X(6,K),X(9,K)
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A96 0874C 8473000O (00251)          MOV(A3),MUL(M0,M7)\NOP           A3=X(20,K-1),X(7,K)
A97 0874E 43510000 (00252)          MOV(A1),ADD(A2,A3)\NOP           A1=X(9,K),X(21,K-1)
A98 08750 0HF00000 (00253)          MOV(IOA,A0)\NOP                  A0=C2
A99 08752 0HF40000 (00254)          MOV(IOA,A4)\NOP                  A4=16**4
A9A 08754 442C0000 (00255)          MOV(M4),ADD(A1,A4)\NOP           M4=X21,K-1),CORRECT X(9,
                   (00256) ;                                         K)
A9B 08756 85920000 (00257)          MOV(A2),MUL(M3,M4)\NOP           A2=X(7,K),X(22,K-1)
A9C 08758 4C310000 (00258)          MOV(A1),SUB(A1,A4)\NOP           CORRECT X(9,K)
A9D 0875A 85330000 (00259)          MOV(A3),MUL(M2,M5)\NOP           A3=X(22,K-1),X10,K)
A9E 0875C 43110000 (00260)          MOV(A1),ADD(A0,A3)\NOP           A1=X(9,K),X(23,K-1)
A9F 0875E 0HF40000 (00261)          MOV(IOA,A4)\NOP                  A4=C7
AA0 08760 0HHC0000 (00262)          MOV(R,M4)\NOP                    M4=X(23,K-1)
AA1 08762 85900000 (00263)          MOV(A0),MUL(M3,M4)\NOP           A0=X(10,K),X(24,K-1)
AA2 08764 44400000 (00264)          ADD(A2,A4)\NOP                   X(11,K)
AA3 08766 4F0D0000 (00265)          MOV(M5),SUB(A0,A7)\NOP           M5=X(11,K),X(12,K)
AA4 08768 0HF20000 (00266)          MOV(IOA,A2)\NOP                  A2=C1
AA5 0876A 84330000 (00267)          MOV(A3),MUL(M0,M5)\NOP           A3=X(24,K-1),X(13,K)
AA6 0876C 43500000 (00268)          MOV(A0),ADD(A2,A3)\NOP           A0=X(12,K),X(25,K-1)
AA7 0876E 0HF40000 (00269)          MOV(IOA,A4)\NOP                  A4=C6
AA8 08770 0HHC0000 (00270)          MOV(R,M4)\NOP                    M4=X(25,K-1)
AA9 08772 85920000 (00271)          MOV(A2),MUL(M3,M4)\NOP           A2=X(13,K),X(26,K-1)
AAA 08774 44400000 (00272)          ADD(A2,A4)\NOP                   X(15,K)
AAB 08776 02AD0000 (00273)          MOV(M5),R(A5)\NOP                M5=X(15,K)
AAC 08778 0HF20000 (00274)          MOV(IOA,A2)\NOP                  A2=C0
AAD 0877A 84330000 (00275)          MOV(A3),MUL(M0,M5)\NOP           A3=X(26,K-1),X(16,K)
AAE 0877C 434B0000 (00276)          MOV(M3),ADD(A2,A3)\NOP           M3=X(2,K),X(27,K-1)
AAF 0877E 0HF40000 (00277)          MOV(IOA,A4)\NOP                  A4=C5
AB0 08780 46850000 (00278)          MOV(A5),ADD(A5,A6)\NOP           A5=X(27,K-1),X(28,K-1)
AB1 08782 49090000 (00279)          MOV(M1),SUB(A0,A1)\NOP           M1=X(28,K-1),X(14,K)
AB2 08784 84030000 (00280)          MOV(A3),MUL(M1,M6)\NOP           A3=X(16,K),X(29,K-1)
AB3 08786 0HF50000 (00281)          MOV(IOA,A5)\NOP                  A5=C4
AB4 08788 44760000 (00282)          MOV(A6),ADD(A3,A4)\NOP           A6=X(14,K),X(17,K)
AB5 0878A 0HD20000 (00283)          MOV(IO,A2)\NOP                   A2=X(0,K+1)
AB6 0878C 0HFD0000 (00284)          MOV(IOA,M5)\NOP                  M5=X(0,K+1)
AB7 0878E 264C0000 (00285)          MOV(M4),RCB(A2)\NOP              M4=X(17,K),X(1,K+1)
AB8 08790 841C0000 (00286)          MOV(D0),MUL(M0,M4)\NOP           D0=X(29,K-1),X(18,K)
AB9 08792 901600HB (00287)          JUMPC(#1,FWI)                    FOR I=1,2
ABA 08794 20372037 (00288)          CLEAR(WI)                        RELEASE APS INPUT
                   (00289) *
                   (00290) *  DCBIAS'=DCBIAS*VAR';VAR'''=20.0*VAR''
ABB 08796 0HF80000 (00291) SNRMS    MOV(IOA,M0)\NOP                  SA=DCBIAS
ABC 08798 0HFF0000 (00292)          MOV(IOA,M7)\NOP                  SB=1.0/VAR
ABD 0879A 000000HF8 (00293)         NOP\MOV(IOA,M0)                  SA'=20.0
ABE 0879C 00000HFF (00294)          NOP\MOV(IOA,M7)                  SB'=VAR''
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 ABF 0879F 84608460 (00295)          MUL(M0,M7)              SA*SB;SA'*SB'
 AC0 087A0 08BC08BC (00296)          MOV(P,00)               SC=SA*SB=DC/VAR;SC'=SA'*
                    (00297) ;                                SB'=20.0*ALOG10(VAR)
 AC1 087A2 20372037 (00298)          CLEAR(WI)               RELEASE APS INPUT
                    (00299) *
 AC2 087A4 081C0000 (00300) DNESA    MOV(ZERO,00)\NOP        CLEAR INFULL
 AC3 087A6 20320000 (00301)          CLEAR(RA)\NOP           APU DONE!
 AC4 087A8 00000000 (00302)          NOP
 AC5 087AA 10000000 (00303)          JUMP(0)
 AC6 087AC 20462046 (00304)          SET(G2)                 >>>>> FOR TIMING PURPOSE
                    (00305) ;                                S ONLY!
           000000C7 (00306)          FDV$SZ=#A-FDV$SA
     087AF          (00307)          END FDV$SZ
                    (00308)          EJECT
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                        (00309) *
                        (00310) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00311) *
                        (00312)          EVEN
    087AE 00008890      (00313)          ADDR G200SI                    POINTER TO CONSTRUCTED I
                        (00314) ;                                       NSTRUCTION BLOCK
    087B0 000087BA      (00315)          ADDR G200S+2*IFLTS             POINTER TO SCALAR BLOCK
    087B2 0000          (00316)          DATA 0                         NUMBER OF SCALARS
    087B3 00F6          (00317)          DATA G200SZ                    MODULE SIZE
    087B4 00008866      (00318)          ADDR G200SA                    POINTER TO CHAIN ANCHOR
                        (00319)          EVEN                           END ON WORD BOUNDARY
                        (00320) *
                        (00321) G200S    BEGIN APS(G200)
A00 087B6 00204240      (00322)          JSN(G200S0,P2)                 SET OUTPUT PC
A01 087B8 02300030      (00323)          SET(RO)                        ENABLE APS OUTPUT
A02 087BA 04C203D0      (00324) IFLTS    LOAD(BRO,SAS39(1),TF)          SCALAR SA=2**15
A03 087BC 06C203FE      (00325)          LOAD(BRO,SAS54(1),TF)          IQ=1.0/LTH
A04 087BE 08D00000      (00326)          LOAD(BR1,(0),TF)               MAPX(.) BA
A05 087C0 0A700000      (00327)          LOAD(BR3,MSS)                  MAPX(.) SZ-1
A06 087C2 0C600000      (00328)          LOAD(BR2,MSS)                  DUMMY
A07 087C4 0E401006      (00329)          LOAD(BRO,(1))                  NIN(.) BA
A08 087C6 10600000      (00330)          LOAD(BR2,MSS)                  NIN(.) SIZE-1
A09 087C8 12020000      (00331)          SUB(BRO,MSS)                   NIN(.) BA-1
A0A 087CA 14390025      (00332)          SUBB(BR3,BR2)                  MAPX SZ - NIN SZ = NUMBE
                        (00333) ;                                       R OF UPDATE SAMPLES
A0B 087CC 16390032      (00334)          SUBL(BR3,2)                    ALREADY XFERRED ONE
A0C 087CE 189A0002      (00335) IUPS     ADD(BR1,2,TF)
A0D 087D0 1A390CB1      (00336)          SUBL(BR3,1),JUMPP(IUPS)
A0E 087D2 1C300037      (00337)          SET(WI)
A0F 087D4 1E000020      (00338)          NOP(0)
A10 087D6 210A0001      (00339) IFLTSI   ADD(BRO,HS,TF)                 IQ=NIN(I)
A11 087D8 22291081      (00340)          SUBL(BR2,1),JUMPP(IFLTSI)      FOR I=0,1,2...NTUPS-1
A12 087DA 24300037      (00341)          SET(WI)                        STALL APS INPUT
A13 087DC 26000020      (00342)          NOP
                        (00343) *
A14 087DE 2840001A      (00344) ISUMSS   LOAD(BRO,(0))                  MAPX(.) BA
A15 087E0 2A500000      (00345)          LOAD(BR1,MSS)                  MAPX(.) SIZE-1
A16 087E2 2C020000      (00346)          SUB(BRO,MSS)                   MAPX(.) BA-2
A17 087E4 2E290011      (00347)          MOVB(BR2,BRO)                  SAVE MAPX(.) BA-2
A18 087E6 30390013      (00348)          MOVB(BR3,BR1)                  SAVE MAPX(.) SIZE-1
A19 087E8 32BA0002      (00349) ISUMSI   ADD(BRO,WS,TF)                 IQ=MAPX(I)
A1A 087EA 34191981      (00350)          SUBL(BR1,1),JUMPP(ISUMSI)      FOR I=0,1,2...LTH-1
A1B 087EC 36300037      (00351)          SET(WI)                        STALL APS INPUT
A1C 087EE 38000020      (00352)          NOP(0)
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                         (00353) *
                         (00354) *
 A1D 087E0 3AC28618 (00355) ISORS1  LOAD(BR0,ISORS1(1),TF)          IQ=CONST=0.5
 A1E 087E2 3CHA0002 (00356)         ADD(BR0,WS,TF)                  IQ=CONST=16**7
 A1F 087E4 3EBA0002 (00357)         ADD(BR0,WS,TF)                  IQ=CONST=2.0
 A20 087E6 40C203F0 (00358)         LOAD(BR0,SAS55(1),TF)           IQ=VAR**2
 A21 087E8 424A03F0 (00359)         LOAD(BR0,SAS55(1),S)
 A22 087EA 458A0001 (00360)         ADD(BR0,HS,T0)                  IQ=EXPONENT
 A23 087EC 46300037 (00361)         SET(W1)                         STALL APS INPUT
                         (00362) *
 A24 087EE 48090015 (00363)         MOVB(BR0,BR2)                   MAPX(.) BA-2
 A25 08800 4A190017 (00364)         MOVB(BR1,BR3)                   MAPX(.) SIZE-1
 A26 08802 4CBA0002 (00365) IVDVS1  ADD(BR0,WS,TF)                  IQ=MAPX(I)
 A27 08804 4F1926B1 (00366)         SUBL(BR1,1),JUMPP(IVDVS1)       FOR I=0,1,2...LTH-1
 A28 08806 50300037 (00367)         SET(W1)                         STALL APS INPUT
 A29 08808 52000020 (00368)         NOP
                         (00369) *
 A2A 0880A 54C20440 (00370) ILOGSS  LOAD(BR0,SAS95(1),L,TF)         IQ=ALOG16(10.0)
 A2B 0880C 56C28600 (00371)         LOAD(BR0,ILOGS1(1),L,TF)        CONST=128.
 A2C 0880E 588A0002 (00372)         ADD(BR0,WS,TF)                  CONSTANT=64.
 A2D 08810 5ABA0002 (00373)         ADD(BR0,WS,TF)                  CONSTANT=C8
 A2E 08812 5C600001 (00374)         LOAD(BR2,HS)                    2 INPUT LOOPS FOR APU(BA
                         (00375) ;                                  D!!)
 A2F 08814 5E0203F0 (00376) #2      LOAD(BR1,SAS55(1),TF)           VAR WHOLE WORD
 A30 08816 615A03F0 (00377)         LOAD(BR1,SAS55(1),S,TE)         VAR H8
 A31 08818 625A03F0 (00378)         LOAD(BR1,SAS55(1),S)            VAR E8
 A32 0881A 659A0001 (00379)         ADD(BR1,HS,T0)
 A33 0881C 66C28606 (00380)         LOAD(BR0,ILOGS2(1),TF)          CONSTANT=C3
 A34 0881E 68700007 (00381)         LOAD(BR3,7)                     8 REMAINING CONSTANTS
 A35 08820 6ABA0002 (00382) #1      ADD(BR0,WS,TF)                  C2,16**4,C7,C1,C6,C0,C5,
                         (00383) ;                                  C4
 A36 08822 6C3935B1 (00384)         SUBL(BR3,HS),JUMPP(#1)          FOR CONSTNT=1,2...8
 A37 08824 6E292EB1 (00385)         SUBL(BR2,HS),JUMPP(#2)          FOR LOOP=1,2
 A38 08826 70C20794 (00386)         LOAD(BR0,DMYS(1),TF)            LAST INPUT THROWN AWAY
 A39 08828 72300037 (00387)         SET(W1)                         STALL APS INPUT
 A3A 0882A 74000020 (00388)         NOP
                         (00389) *
 A3B 0882C 76C203EA (00390) INRMSS  LOAD(BR0,SAS52(1),TF)           IQ=DC
 A3C 0882E 78C2043C (00391)         LOAD(BR0,SAS93(1),TF)           IQ=1.0/VAR
 A3D 08830 7AC2043E (00392)         LOAD(BR0,SAS94(1),TF)           IQ=20.0
 A3E 08832 7CC203F0 (00393)         LOAD(BR0,SAS55(1),TF)           IQ=ALOG10(VAR)
 A3F 08834 7E300037 (00394)         SET(W1)                         STALL APS INPUT
                         (00395) *
                         (00396) *
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A40 08836 80200031 (00397) DNESI   CLEAR(RI)                        APS INPUT DONE!
A41 08838 82000020 (00398)         NOP
                   (00399) *
A42 0883A 84300032 (00400) G200SO  SET(RA)                          ENABLE APU
A43 0883C 8742057F (00401)         LOAD(BW0,ISAS125(1),TF)          OO=CALLIN CARD=0
A44 0883F 88701060 (00402) OFLTS   LOAD(BW3,[1])                    DUMMY OP FOR EXEC
A45 08840 8A500000 (00403)         LOAD(BW1,MSS)                    NIN(.) SIZE-1
A46 08842 8C320000 (00404)         SUB(BW3,MSS)                     DUMMY OP FOR EXEC
A47 08844 8F400006 (00405)         LOAD(BW0,[0])                    MAPX(.) BA
A48 08846 90700000 (00406)         LOAD(BW3,MSS)                    MAPX(.) SIZE-1
A49 08848 92020000 (00407)         SUB(BW0,MSS)                     MAPX(.) BA-2
A4A 0884A 94210010 (00408)         MOVB(BW2,BW0)                    SAVE MAPX(.) BA-2
A4B 0884C 960A0014 (00409)         ADD(BW0,NP2S)                    MAPX(.) BA-2+2*NP
A4C 0884F 988A0002 (00410) OFLTSJ  ADD(BW0,WS,TF)                   OO=MAPX(J)
A4D 08850 9A8A0002 (00411)         ADD(BW0,WS,TF)                   OO=MAPX(J+1)
A4F 08852 9C114C82 (00412)         SUBL(BW1,2),JUMPP(OFLTSJ)        FOR J=NP,NP+1,....LTH-1
                   (00413) *
A4F 08854 9FC203FA (00414) OSUMSS  LOAD(BW0,SAS52(1),TF)            OO=DCBIAS
                   (00415) *
A50 08856 A0010014 (00416) OSUBSD  MOVB(BW0,BW2)                    SAVE MAPX(.) BA-2
A51 08858 A2110016 (00417)         MOVB(BW1,BW3)                    SAVE MAPX(.) SIZE-1
A52 0885A A48A0002 (00418) OSUBSJ  ADD(BW0,WS,TF)                   OO=MAPX(J)
A53 0885C A68A0002 (00419)         ADD(BW0,WS,TF)                   OO=MAPX(J+1)
A54 0885E A8115282 (00420)         SUBL(BW1,2),JUMPP(OSUBSJ)        FOR J=0,1,2,...LTH-1
                   (00421) *
A55 08860 AAC203F0 (00422) OVSOSS  LOAD(BW0,SAS55(1),TF)            OO=VAR**2
                   (00423) *
A56 08862 ACC203F0 (00424) OSORSS  LOAD(BW0,SAS55(1),TF)            OO=SORT(SD)=VAR
                   (00425) *
A57 08864 AFC2043C (00426) OINVSS  LOAD(BW0,SAS93(1),TF)            OO=1.0/VAR
                   (00427) *
A58 08866 80402022 (00428) ODIVSD  LOAD(BW0,[2]                     REFLECTION BASE
A59 08868 82500000 (00429)         LOAD(BW1,MSS)                    REFLN SIZE-1
A5A 0886A 84600000 (00430)         LOAD(BW2,MSS)                    DUMMY
A5B 0886C 86210010 (00431)         MOVB(BW2,BW0)
A5C 0886F 8811002A (00432)         ADDB(BW1,BW1)                    (N-1)*2
A5D 08870 8A21002A (00433)         ADDB(BW2,BW1)
A5E 08872 8C21002A (00434)         ADDB(BW2,BW1)                    (N-1)*4 + REFLN BASE =XR
                   (00435) ;                                        (N-1)
A5F 08874 8F010032 (00436)         SUBL(BW0,2)                      XI(-1)
A60 08876 C021003C (00437)         ADDL(BW2,4)                      XI(N)
A61 08878 C28A0002 (00438) ORFLSJ  ADD(BW0,2,TF)                    XR(K)
A62 0887A C48A0002 (00439)         ADD(BW0,2,TF)                    XI(K)
A63 0887C C6A20002 (00440)         SUB(BW2,2,TF)                    XI(N-K-1)
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A64 0887E CHA20002 (00441)          SUB(RW2,2,TF)                          XR(N-K-1)
A65 08880 CA116184 (00442)          SUBL(RW1,4),JUMPP(DREFLSJ)             FOR K=0,1,...N/2-1.
                   (00443) *
A66 08882 CCC20794 (00444) DLOGSD   LOAD(RW0,DMYS(1),TF)                   00=?
A67 08884 CFC203E0 (00445)          LOAD(RW0,SAS55(1),TF)                  00=ALOG10(VAR)
                   (00446) *
A68 08886 D0C203FA (00447) DNRMSS   LOAD(RW0,SAS52(1),TF)                  00=DC/VAR
A69 08888 D2C203E0 (00448)          LOAD(RW0,SAS55(1),TF)                  00=20.0*ALOG10(VAR)
A6A 0888A D5420570 (00449)          LOAD(RW0,ISAS110(1),TF)                CLEAR INFULL
                   (00450) *
                   (00451) *
A6B 0888C D6200030 (00452) DNESD    CLEAR(R0)                              APS OUTPUT DONE!
A6C 0888E D8000020 (00453)          NOP
                   (00454) *
          00008866 (00455)          G200SA= #C                             ASSIGN VALUE TO CHAIN AN
                   (00456) ;                                               CHOR
    08890          (00457)          END #A-1
                   (00458) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    08890 00000000 (00459) G200SI   DATA 6F'0.0'
     ...
          000000F6 (00460)          G200SZ=#L-G200S
    0889C          (00461)          END
```

```
AFDT$ORG:   008FB (00007) (00031)
CSPU$MOS:   021FC (00008) (00034)
DMYS:       00794 (00009) (00386) (00444)
DNFSA:      000C2 (00300)
DNFSI:      00040 (00397)
DNFSO:      00068 (00452)
FDVS:       08620 (00032) (00081)
FDVSSA:     00000 (00079) (00083) (00306)
FDVSSZ:     000C7 (00080) (00306) (00307)
FLSM1:      00006 (00091) (00094)
FLSM2:      0000F (00098) (00101)
FLTSM:      0000D (00099) (00107)
G200S:      08786 (00033) (00315) (00321) (00460)
G200SA:     08866 (00318) (00455)
G200SI:     08890 (00313) (00459)
G200SO:     00042 (00322) (00400)
G200S7:     000F6 (00317) (00460)
HS:         00001 (00011) (00339) (00360) (00374) (00379) (00384) (00385)
IFLTS:      00002 (00315) (00324)
IFLTSI:     00010 (00339) (00340)
ILOGS1:     08600 (00043) (00371)
ILOGS2:     08606 (00049) (00380)
ILOGSS:     0002A (00370)
INRMSS:     0003B (00390)
ISAS110:    00570 (00016) (00449)
ISAS125:    0057F (00015) (00401)
ISQRS1:     08618 (00068) (00355)
ISQRSI:     0001D (00355)
ISUMSI:     00019 (00349) (00350)
ISUMSS:     00014 (00344)
ISVTS:      00502 (00014) (00015) (00016)
IUPS:       0000C (00335) (00336)
IVDVSI:     00026 (00365) (00366)
MSS:        00000 (00012) (00327) (00328) (00330) (00331) (00345) (00346) (00403) (00404) (00406)
                  (00407) (00429) (00430)
NP2S:       00014 (00013) (00409)
ODIVSD:     00058 (00428)
OFLTS:      00044 (00402)
OFLTSJ:     0004C (00410) (00412)
OINVSS:     00057 (00426)
OLOGSD:     00066 (00444)
ONRMSS:     00068 (00447)
ORFLSJ:     00061 (00438) (00442)
OSORSS:     00056 (00424)
```

```
DSUBSD:    00050 (00416)
DSUBSJ:    00052 (00418) (00420)
DSUMSS:    0004F (00414)
DVSUSS:    00055 (00422)
SAS39:     003D0 (00018) (00324)
SAS52:     003EA (00019) (00390) (00414) (00447)
SAS54:     003FF (00020) (00325)
SAS55:     003F0 (00021) (00358) (00359) (00376) (00377) (00378) (00393) (00422) (00424) (00445)
                 (00448)
SAS93:     0043C (00022) (00391) (00426)
SAS94:     0043F (00023) (00392)
SAS95:     00440 (00024) (00370)
SINVS:     0006B (00200)
SLDGS:     00084 (00233)
SNRMS:     0008B (00291)
SO1:       00024 (00126) (00135)
SO2:       00025 (00125) (00127)
SSORTS:    00039 (00151)
START:     08600 (00025) (00039)
SVTS:      003B2 (00017) (00018) (00019) (00020) (00021) (00022) (00023) (00024)
VMULS:     0007B (00222)
VSOS:      00021 (00123)
WS:        00002 (00026) (00349) (00356) (00357) (00365) (00372) (00373) (00382) (00410) (00411)
                 (00418) (00419)
WWS:       00004 (00027)
ZS:        00003 (00028)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E=    0
```

```
                       * FCB 241... "MPDCTM(Y,U,V,W)"    FORM TRUE DCT AND ITS REFLECTED MAG SQUARED, VIA
                       *                                 ORIGINATED:06-OCT-79
                       *                                 UPDATED:29-FEB-80
                       * DEFINE GLOBAL SYMBOLS
                              OPADD EXP,(1 .LS. 14)+(12 .LS. 8)+$1E
      00000BEB                AFDTSORG=$BEB
      000021FC                CSPU$NOS=$21FC
      00000794                DMY$=$794
      00000003                #M=3
      00000001                H$=1
      00000000                M$$=0
      00000014                NP2$=2*D'10'
      00000382                SVT$=$0382
      00008900                START=$8900
      00000002                W$=2
      00000004                WW$=4
      00000003                Z$=3
                       *
                       * EXPAND ARRAY FUNCTION DISPATCH TABLE
      00000BBE                #L=AFDTSORG+3*2*(241-128)                        FCB 241
00BBE 001FB902                ADDR DCTM$(R7,1)
00B90 001FB964                ADDR DCTM$$(R7,1)
00B92 001021FC                ADDR CSPU$NOS(,1,0)
                       *
      00008900                #L=START
                              EVEN
                              EJECT
```

```
                              *  MPDCTM(DCT,MDCT,V,MCOS)
                              *  WHERE DCT IS THE DCT OUTPUT, MDCT IS THE MAG SQUARED OF THE
                              *  OUTPUT, REFLECTED TO BE SYMMETRIC, V IS THE COMPLEX INPUT, AND
                              *  VCOS IS A COSINE TABLE FROM 0 TO PI/2, OF THE SAME LENGTH AS DCT.
                              *>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<
                              *JOHN MAKHOUL'S SHORT DCT ALGORITHM
                              *  DCT(K)=2*RE[EXP(-PI*K/2N)*V(K)]    K<=N/2
                              *  DCT(N-K)=-2*IM[... (K) ...]
                              *
                              *  THIS PROGRAM WORKS ONLY FOR N=256!!!<<<<<<<<<<<<<<<<<
                              *  THE APS CODE MUST BE CHANGED FOR OTHER SIZES.
                              *
                                       EVEN
    08900 0000                         DATA DCTMSSA
    08901 0020                         DATA DCTMSSZ
                              DCTMS    BEGIN APU(DCTM)
          00000000                     #A=0
                              *
A00 08902 08F80000            DCTMSSA  MOV(IQA,M0)\NOP                            COS(N/2)
A01 08904 08D20802                     MOV(IQ,A2)                                 VR(0)
A02 08906 08F308F3                     MOV(IQA,A3)                                VR(0)
A03 08908 43404340                     ADD(A2,A3)                                 2*VR(0)
A04 0890A 089C088B                     MOV(R,DQ)\MOV(P,M3)                        D(0)=2VR(0)
A05 0890C 08FD088C                     MOV(IQA,M5)\MOV(R,M4)                      VR(N/2)\PREPARE TO SQUAR
                              ;                                                   E
A06 0890E 84208580                     MUL(M0,M5)\MUL(M3,M4)                      COS(N/2)*VR(N/2)\D(0)^2
A07 08910 08B20000                     MOV(P,A2)\NOP
A08 08912 08B30000                     MOV(P,A3)\NOP
A09 08914 43400000                     ADD(A2,A3)\NOP                             2*RE[W(N/2)*V(N/2)]
A0A 08916 089C08BC                     MOV(R,DQ)\MOV(P,DQ)                        D(N/2)\MR(0)
A0B 08918 088B081C                     MOV(R,M3)\MOV(ZERO,DQ)                     D(N/2)\MI(0)
A0C 0891A 088E0000                     MOV(R,M6)\NOP                              D(N/2)
A0D 0891C 85C00000                     MUL(M3,M6)\NOP                             D(N/2)^2
A0E 0891E 08F808F8                     MOV(IQA,M0)                                COS(K)
A0F 08920 08F908F9                     MOV(IQA,M1)                                SIN(K)
A10 08922 08FC08FC                     MOV(IQA,M4)                                VR(K)
A11 08924 08FD08FD                     MOV(IQA,M5)                                VI(K)
A12 08926 08BC081C                     MOV(P,DQ)\MOV(ZERO,DQ)                     MR(N/2)\MI(N/2)
A13 08928 081C081C                     MOV(ZERO,DQ)                               MR(N)\MI(N)
A14 0892A 08BC081C                     MOV(P,DQ)\MOV(ZERO,DQ)                     MR(3N/2)\MI(3N/2)
A15 0892C 84008420            DCTLP    MUL(M0,M4)\MUL(M0,M5)                      COS*VR\COS*VI
A16 0892E 84808490                     MOV(A0),MUL(M1,M5)\MOV(A0),MUL(M1,M4)      SIN*VI\SIN*VR
A17 08930 08B108B1                     MOV(P,A1)
A18 08932 41004820                     ADD(A0,A1)\SUB(A1,A0)                      COS*VR+SIN*VI\SIN*VR-COS
```

```
                                 ;                          *VI
A19 08934 08F805F8               MOV(IQA,M0)
A1A 08936 08F908F9               MOV(IQA,M1)                SIN(K+1)
A1B 08938 08920892               MOV(R,A2)
A1C 0893A 43534353               MOV(A3),ADD(A2,A3)         GET FACTOR OF 2 IN THERE
A1D 0893C 08FC08FC               MOV(IQA,M4)
A1E 0893E 08FD08FD               MOV(IQA,M5)                VI(K+1)
A1F 08940 088A088A               MOV(R,M2)                  PREPARE TO SQUARE
A20 08942 088E088E               MOV(R,M6)
A21 08944 85408540               MUL(M2,M6)                 SQUARE REAL IMAG PARTS
A22 08946 089C089C               MOV(R,OO)                  D(K)\D(N-K)
A23 08948 088C081C               MOV(P,OO)\MOV(ZERO,OO)     D(K)^2=MR(K)\MI(K)
A24 0894A 0000088C               NOP\MOV(P,OO)              MR(N-K)
A25 0894C 081C0000               MOV(ZERO,OO)\NOP           MI(N-K)
A26 0894E 088C081C               MOV(P,OO)\MOV(ZERO,OO)     MR(2N-K)\MI(2N-K)
A27 08950 0000088C               NOP\MOV(P,OO)              MR(N+K)
A28 08952 081C0000               MOV(ZERO,OO)\NOP           MI(N+K)
A29 08954 901D0015               JUMPC(DCTLP,FI)
A2A 08956 20322032               CLEAR(RA)
A2B 08958 00000000               NOP
A2C 0895A 10000000               JUMP(0)
                                 *
                0000002D         DCTMSSZ=#A-DCTMSSA
    0895C                        END DCTMSSZ
                                 EJECT
```

```
                        (00097) *
                        (00098) *>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<
                        (00099) *INPUT STREAM: COS(PI/4),VR(0),VR(N/2)[COS(PI*K/2N),SIN(PI*K/2N)
                        (00100) *         VR(K),VI(K)],FI.  K=[N/2-1,N/2-2,...,1]
                        (00101) *
                        (00102)         EVEN
     0895C 000089F0     (00103)         ADDR DCTMS1
     0895E 00008964     (00104)         ADDR DCTMSS
     08960 0000         (00105)         DATA 0
     08961 0094         (00106)         DATA DCTMSZ
     08962 0000899F     (00107)         ADDR DCTMSA
                        (00108)         EVEN
                        (00109) *
                        (00110) DCTMSS  BEGIN APS(DCTMSS)
A00 08964 00201940      (00111)         JSR(DCTMS0,P2)
A01 08966 02300030      (00112)         SET(R0)
A02 08968 04403000      (00113)         LOAD(BR0,[3])                        COS(0)
A03 0896A 06500000      (00114)         LOAD(BR1,MSS)                        N-1=255
A04 0896C 08600000      (00115)         LOAD(BR2,MSS)                        DUMMY
A05 0896E 0A602006      (00116)         LOAD(BR2,[2])                        VR(0)
A06 08970 0C700000      (00117)         LOAD(BR3,MSS)                        N-1
A07 08972 0E500000      (00118)         LOAD(BR1,MSS)                        DUMMY
A08 08974 1009002F      (00119)         ADDB(BR0,BR3)                        COS(N/2)-1
A09 08976 12890039      (00120)         ADDL(BR0,1,TF)                       COS(N/2)
A0A 08978 14190011      (00121)         MOVB(BR1,BR0)                        SIN(N/2)=COS(N/2)
A0B 0897A 16A90015      (00122)         MOVB(BR2,BR2,TF)                     VR(0)
A0C 0897C 1829002F      (00123)         ADDB(BR2,BR3)                        VR(0)+N-1
A0D 0897E 1A29002F      (00124)         ADDB(BR2,BR3)                        VR+2N-2=VR(N/2)-2
A0E 08980 1CA9003A      (00125)         ADDL(BR2,2,TF)                       VR(N/2)
A0F 08982 1E2A0002      (00126)         ADD(BR2,2)                           VI(N/2)
A10 08984 20390032      (00127)         SUBL(BR3,2)                          COUNT FIRST BUNCH
                        (00128) *  LOOP FOR K=N/2-1 TO 1
A11 08986 22820002      (00129) *1      SUB(BR0,2,TF)                        COS(K)
A12 08988 249A0002      (00130)         ADD(BR1,2,TF)                        SIN(K)
A13 0898A 26A90036      (00131)         SUBL(BR2,6,TF)                       VR(K)
A14 0898C 28A9003A      (00132)         ADDL(BR2,2,TF)                       VI(K)
A15 0898E 2A3911B2      (00133)         SUBL(BR3,2),JUMPP(*1)
A16 08990 2CC20794      (00134)         LOAD(BR0,DMYS(1),TF)                 NEED AT LEAST ONE DUMMY
A17 08992 2E200031      (00135)         CLEAR(RT)
A18 08994 30000020      (00136)         NOP(0)
                        (00137) *
                        (00138) *  OUTPUT PROGRAM
                        (00139) *  OUTPUT STREAM:D(0),D(N/2),MR(0),MI(0),MR(N/2),MI(N/2),MR(N),
                        (00140) *  MI(N),MR(3N/2),MI(3N/2),[D(K),D(N-K),MR(K),MI(K),MR(N-K),
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                      (00141) *   MI(N-K),MR(2N-K),MI(2N-K),MR(N+K),MI(N+K)],EQ.
                      (00142) *          K=[N/2-1,N/2-2,...,1]  N=256
                      (00143) *
A19 08996 32300032 (00144) DCTMSQ  SET(RA)
A1A 08998 3440002A (00145)         LOAD(BW0,[0])                   D(0)
A1B 0899A 36500000 (00146)         LOAD(BW1,M$S)                   N-1
A1C 0899C 38600000 (00147)         LOAD(BW2,M$S)                   DUMMY
A1D 0899E 3A601006 (00148)         LOAD(BW2,[1])                   MR(0)
A1E 089A0 3C700000 (00149)         LOAD(BW3,M$S)                   DUMMY
A1F 089A2 3E700000 (00150)         LOAD(BW3,M$S)                   DUMMY
A20 089A4 40810010 (00151)         MOVB(BW0,BW0,TF)                D(0)
A21 089A6 42110039 (00152)         ADDL(BW1,1)                     2*N/2
A22 089A8 4481002A (00153)         ADDB(BW0,BW1,TF)                D(N/2)
A23 089AA 4611002A (00154)         ADDB(BW1,BW1)                   2*N/2*W$ (=2*K)
A24 089AC 48310012 (00155)         MOVB(BW3,BW1)                   2N (=4*N/2)
A25 089AE 4A31002E (00156)         ADDB(BW3,BW3)                   4*2*N/2 (2*K=2*N/2)
A26 089B0 4C010022 (00157)         SUBB(BW0,BW1)                   D(-N/2)
A27 089B2 4E01003A (00158)         ADDL(BW0,2)                     D(-N/2+1)
A28 089B4 50110034 (00159)         SUBL(BW1,4)                     2*(N/2-1)*W$ (=2*K(NEW))
A29 089B6 52A10014 (00160)         MOVB(BW2,BW2,TF)                MR(0)
A2A 089B8 54AA0002 (00161)         ADD(BW2,2,TF)                   MI(0)
A2B 089BA 56AA01FE (00162)         ADD(BW2,4*128-2,TF)             MR(N/2)
A2C 089BC 58AA0002 (00163)         ADD(BW2,2,TF)                   MI(N/2)
A2D 089BE 5AAA01FE (00164)         ADD(BW2,4*128-2,TF)             MR(N)
A2E 089C0 5CAA0002 (00165)         ADD(BW2,2,TF)                   MI(N)
A2F 089C2 5EAA01FE (00166)         ADD(BW2,4*128-2,TF)             MR(3N/2)
A30 089C4 60AA0002 (00167)         ADD(BW2,2,TF)                   MI(3N/2)
A31 089C6 62320009 (00168)         SUB(BW3,9)                      4*2*(N/2-1)-1 (-1 FOR LO
                   (00169) :                                       OP TEST UPDATE)
A32 089C8 64310039 (00170) #1      ADDL(BW3,1)                     RESTORE FROM LOOP TEST
A33 089CA 6681002A (00171)         ADDB(BW0,BW1,TF)                D(K)
A34 089CC 680A0200 (00172)         ADD(BW0,2*256)                  D(N+K)
A35 089CE 6A810022 (00173)         SUBB(BW0,BW1,TF)                D(N-K)
A36 089D0 6C0201FE (00174)         SUB(BW0,2*256-2)                D(-K+1)
A37 089D2 6EA20406 (00175)         SUB(BW2,4*256+6,TF)             MR(K)
A38 089D4 70AA0002 (00176)         ADD(BW2,2,TF)                   MI(K)
A39 089D6 722A03FE (00177)         ADD(BW2,4*256-2)                MR(N+K)
A3A 089D8 74A10026 (00178)         SUBB(BW2,BW3,TF)                MR(N-K)
A3B 089DA 76AA0002 (00179)         ADD(BW2,2,TF)                   MI(N-K)
A3C 089DC 78AA03FE (00180)         ADD(BW2,4*256-2,TF)             MR(2N-K
A3D 089DE 7AAA0002 (00181)         ADD(BW2,2,TF)                   MI(2N-K)
A3E 089E0 7C220402 (00182)         SUB(BW2,4*256+2)                MR(N-K)
A3F 089E2 7EA1002E (00183)         ADDB(BW2,BW3,TF)                MR(N+K)
A40 089E4 80AA0002 (00184)         ADD(BW2,2,TF)                   MI(N+K)
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A41 089E6 82110034 (00185)         SUBL(BW1,4)                      2K GETS 2(K-W$)
A42 089E8 84320008 (00186)         SUB(BW3,8)                       2K GETS 2(K-C$) (COMPLEX
A43 089EA 863132B1 (00187)         SUBL(BW3,1),JUMPP(#1)            2K GETS 2K-1 SO TEST FAI
                   (00188) ;                                        LS FOR 0
A44 089EC 88200030 (00189)         CLEAR(R0)
A45 089EE 8A000020 (00190)         NOP(0)
                   (00191) *
          0000899E (00192)         DCTMSA=#C
    089F0          (00193)         END #A-1
    089F0 00000000 (00194) DCTMST  DATA 4F'0,0'
     ...
          00000094 (00195)         DCTMSZ=#L-DCTMSS
    089F8          (00196)         END
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AFDT$ORG:  008F8 (00006) (00020)
CSPU$NOS:  021FC (00007) (00023)
DCTLP:     00015 (00068) (00089)
DCTMS:     08902 (00021) (00043)
DCTMSA:    0899E (00107) (00192)
DCTMSI:    089F0 (00103) (00194)
DCTMSO:    00019 (00111) (00144)
DCTMSS:    08964 (00022) (00104) (00110) (00195)
DCTMSSA:   00000 (00041) (00046) (00094)
DCTMSSZ:   0002D (00042) (00094) (00095)
DCTMSZ:    00094 (00106) (00195)
DMYS:      00794 (00008) (00134)
HS:        00001 (00010)
MSS:       00000 (00011) (00114) (00115) (00117) (00118) (00146) (00147) (00149) (00150)
NP2$:      00014 (00012)
START:     08900 (00014) (00025)
SVTS:      00382 (00013)
WS:        00002 (00015)
WWS:       00004 (00016)
ZS:        00003 (00017)

LINES WITH ERRORS:   0  (MAP VERSION R00101.10)   E-   0
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                   (00001) *  FCB 242... "MPQDPP(Y,U,V)"      QUANTIZE/DEQUANTIZE SIDEBAND
                   (00002) *                                  W/ K->A TRANSFORM
                   (00003) *                                  ORIGINATED:08-AUG-79
                   (00004) *                                  UPDATED:12-MAY-80
                   (00005) *  DEFINE GLOBAL SYMBOLS
00000012 (00006)           A1S=D'18'
000008F8 (00007)           AFDTSORG=$8F8
0001FFC0 (00008)           APSSMEM=$1FFC0
000021FC (00009)           CSPUSNOS=$21FC
00000009 (00010)           DCPOS=D'9'
00000003 (00011)           #M=3
00000001 (00012            HS=1
00000000 (0001             MS=0
00000000 (00014)           MSS=0
0000000A (00015)           MPOS=D'10'
0000000C (00016)           PGPOS=D'12'
00002134 (00017)           PDFQS1=$2134
00002174 (00018)           PDFQS2=$2174
000021B4 (00019)           PDFQS3=$21B4
000021D4 (00020)           PDFQS4=$21D4
000021F4 (00021)           PDFQS5=$21F4
00002204 (00022)           PDFQS6=$2204
00002214 (00023)           PDFQS7=$2214
0000221C (00024)           PDFQS8=$221C
00002224 (00025)           DCSDEQ=$2224
00002244 (00026)           VARSDEQ=$2244
00002284 (00027)           PGSDEQ=$2284
0000228C (00028)           MSDEQ=$228C
00000382 (00029)           SVTS=$0382
00000023 (00030)           PARCS=D'35'
00000007 (00031)           PSIZES=D'8'-D'1'
00002E28 (00032)           QPRMS=D'11816'
00000398 (00033)           SAS11=SVTS+2*D'11'
000003CE (00034)           SAS38=SVTS+2*D'38'
000003D0 (00035)           SAS39=SVTS+2*D'39'
000003EA (00036)           SAS52=SVTS+2*D'52'
000003F0 (00037)           SAS55=SVTS+2*D'55'
000003FA (00038)           SAS60=SVTS+2*D'60'
000003FC (00039)           SAS61=SVTS+2*D'61'
000003FE (00040)           SAS62=SVTS+2*D'62'
00000432 (00041)           SAS88=SVTS+2*D'88'
00000434 (00042)           SAS89=SVTS+2*D'89'
00000436 (00043)           SAS90=SVTS+2*D'90'
00000438 (00044)           SAS91=SVTS+2*D'91'
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           0000043A (00045)        SAS92=SVTS+2*D'92'
           00000452 (00046)        SAS104=SVTS+2*D'104'
           000065F0 (00047)        START=$65F0
           0000000B (00048)        VPOS=D'11'
           00000008 (00049)        VARPOS=D'8'
           00000002 (00050)        WS=2
           00000003 (00051)        ZS=3
                    (00052) *
                    (00053) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
           00000B94 (00054)        *L=AFDTSORG+3*2*(242-128)                  FCB 242
     00B94 001E65F2 (00055)        ADDR QUANS(R7,1)
     00B96 001E66F2 (00056)        ADDR G105S(R7,1)
     00B98 001021FC (00057)        ADDR CSPUSNOS(,1,0)
                    (00058)        EJECT
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                    (00059) *
                    (00060) *>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00061) *
                    (00062)          BUS 2
          00001F40  (00063)          #L=D'8000'
                    (00064)          EVEN
                    (00065) *
                    (00066) *             >>>>> QUANTIZER THRESHOLDS <<<<<
                    (00067) *  PARCOR(1) W/ 5 BITS
01F40 21919ABF (00068) PVECS1  DATA  0.16391E-01,  0.33470E-01,  0.51313E-01,  0.69970E-01
01F42 448BEB3F
01F44 6916CA3F
01F46 0BF4C6C0
01F48 0F810FC0 (00069)         DATA  0.89676E-01,  0.11219E+00,  0.13700E+00,  0.16288E+00
01F4A 0F5C3DC0
01F4C 11893740
01F4E 14D94040
01F50 184AB640 (00070)         DATA  0.18978E+00,  0.21909E+00,  0.25131E+00,  0.28606E+00
01F52 1C0B2440
01F54 202AFD40
01F56 249D9D40
01F58 297F62C0 (00071)         DATA  0.32420E+00,  0.36803E+00,  0.41824E+00,  0.47689E+00
01F5A 2F1B9B40
01F5C 35BBF340
01F5E 3D0ABB40
01F60 45873FC0 (00072)         DATA  0.54319E+00,  0.61470E+00,  0.69616E+00,  0.77133E+00
01F62 4FAF7D40
01F64 591BC540
01F66 62BAF0C0
01F68 6BF62B40 (00073)         DATA  0.84345E+00,  0.92970E+00,  0.10190E+01,  0.11218E+01
01F6A 77006BC0
01F6C 0B26F941
01F6E 0BF97241
01F70 09FC2241 (00074)         DATA  0.12403E+01,  0.13426E+01,  0.14437E+01,  0.15414E+01
01F72 0ABDA541
01F74 06BCB2C1
01F76 0C54C9C1
01F78 0D27B6C1 (00075)         DATA  0.16443E+01,  0.17886E+01,  0.19332E+01,  0.10000E+21
01F7A 0E4F0DC1
01F7C 0F7731C1
01F7E 2B5F3AD1
                    (00076) *
                    (00077) *  PARCOR(2) W/ 5 BITS
01F80 166AFCC0 (00078) PVECS2  DATA  0.17514E+00,  0.31624E+00,  0.41542E+00,  0.50895E+00
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01F82 287A8D40
01F84 352C7BC0
01F86 41254640
01F88 48885BC0 (00079)          DATA  0.59019E+00,  0.65272E+00,  0.70886E+00,  0.76395E+00
01F8A 538C5440
01F8C 5A8BECC0
01F8E 61C91D40
01F90 68CDC840 (00080)          DATA  0.81878E+00,  0.87625E+00,  0.94152E+00,  0.10123E+01
01F92 7028E5C0
01F94 7883BA40
01F96 081930C1
01F98 08AD7741 (00081)          DATA  0.10847E+01,  0.11620E+01,  0.12381E+01,  0.13059E+01
01F9A 0948CEC1
01F9C 09E7A0C1
01F9E 0A727BC1
01FA0 0AEB4A41 (00082)          DATA  0.13727E+01,  0.14357E+01,  0.14920E+01,  0.15468E+01
01FA2 0B7C5041
01FA4 0BEE9DC1
01FA6 0C5EDBC1
01FA8 0CD04841 (00083)          DATA  0.16017E+01,  0.16527E+01,  0.16951E+01,  0.17323E+01
01FAA 0D38BAC1
01FAC 0D8E90C1
01FAE 0DDBC041
01FB0 0E257A41 (00084)          DATA  0.17683E+01,  0.18035E+01,  0.18365E+01,  0.18668E+01
01FB2 0E6D9141
01FB4 0EB126C1
01FB6 0EEF34C1
01FB8 0F2B3641 (00085)          DATA  0.18961E+01,  0.19267E+01,  0.19616E+01,  0.10000E+21
01FBA 0E69E1C1
01FBC 0EB15B41
01FBE 2B5F3AD1
               (00086) *
               (00087) *  PARCOR(3) W/ 4 BITS
01FC0 28581840 (00088) PVECS3  DATA  0.31528E+00,  0.45224E+00,  0.56230E+00,  0.65753E+00
01FC2 39E30040
01FC4 47E97240
01FC6 5429E140
01FC8 5E5A31C0 (00089)          DATA  0.74494E+00,  0.82867E+00,  0.91130E+00,  0.99458E+00
01FCA 6A11DBC0
01FCC 74A57A40
01FCE 7E4E65C0
01FD0 08A2D0C1 (00090)          DATA  0.10795E+01,  0.11678E+01,  0.12608E+01,  0.13581E+01
01FD2 0957A7C1
01FD4 0A161E41
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01FD6 0ADD63C1
01FD8 08B1F8C1 (00091)          DATA  0.14619E+01,  0.15854E+01,  0.17491E+01,  0.10000E+21
01FDA 0CAFF641
01FDC 0DFF2841
01FDE 285F3AD1
                (00092) *
                (00093) *  PARCOR(4) W/ 4 BITS
01FE0 3462F5C0 (00094) PVFCS4  DATA  0.40927E+00,  0.57217E+00,  0.69580E+00,  0.80120E+00
01FE2 493C0DC0
01FE4 590FF940
01FE6 668D8BC0
01FE8 72C04AC0 (00095)          DATA  0.89689E+00,  0.98763E+00,  0.10764E+01,  0.11650E+01
01FEA 7F6AABC0
01FEC 089C77C1
01FEE 0951F8C1
01FF0 0A09A041 (00096)          DATA  0.12547E+01,  0.13464E+01,  0.14408E+01,  0.15388E+01
01FF2 0AC56D41
01FF4 0B86C241
01FF6 0C4F7641
01FF8 0D22D0C1 (00097)          DATA  0.16420E+01,  0.17540E+01,  0.18815E+01,  0.10000E+21
01FFA 0F083141
01FFC 0F0D4FC1
01FFE 285F3AD1
                (00098) *
                (00099) *  PARCOR(5) W/ 3 BITS
02000 4747D840 (00100) PVFCS5  DATA  0.55688E+00,  0.74670E+00,  0.89149E+00,  0.10220E+01
02002 5F93DDC0
02004 721C5840
02006 082D0F41
02008 093B8641 (00101)          DATA  0.11526E+01,  0.12967E+01,  0.14823E+01,  0.10000E+21
0200A 0A5FA441
0200C 0BDBC041
0200E 285F3AD1
                (00102) *
                (00103) *  PARCOR(6) W/ 3 BITS
02010 49623BC0 (00104) PVFCS6  DATA  0.57331E+00,  0.76317E+00,  0.90902E+00,  0.10407E+01
02012 61AFBDC0
02014 745AC440
02016 08535AC1
02018 096147C1 (00105)          DATA  0.11725E+01,  0.13190E+01,  0.15093E+01,  0.10000E+21
0201A 0A8D4FC1
0201C 0C1308C1
0201E 285F3AD1
                (00106) *
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                   (00107) *  PARCOR(7) W/ 2 BITS
02020 46A3D740 (00108) PVECS7  DATA  0.56750E+00,  0.87517E+00,  0.11666E+01,  0.10000E+21
02022 700591C0
02024 09553241
02026 285F3AD1
                   (00109) *
                   (00110) *  PARCOR(8) W/ 2 BITS
02028 5C6A2B40 (00111) PVECS8  DATA  0.72199E+00,  0.98497E+00,  0.12430E+01,  0.10000E+21
0202A 7E137E40
0202C 09F1A9C1
0202E 285F3AD1
                   (00112) *
                   (00113) *  DC BIAS W/ 4 BITS
02030 0FE7CFC0 (00114) DCS     DATA  0.12475E+00,0.25019E+00,0.37706E+00,0.50625E+00
02032 200639C0
02034 30438DC0
02036 40CCCCC0
02038 51C486C0 (00115)         DATA  0.63881E+00,0.77594E+00,0.91903E+00,0.10699E+01
0203A 63520040
0203C 75A2C640
0203E 088E27C1
02040 09D8F241 (00116)         DATA  0.12309E+01,0.14053E+01,0.15977E+01,  0.18155E+01
02042 083F0DC1
02044 0CC816C1
02046 0E8624C1
02048 109308C1 (00117)         DATA  0.20718E+01,  0.23938E+01,  0.28541E+01,  0.10000E+21
0204A 132680C1
0204C 16D53241
0204E 285F3AD1
                   (00118) *
                   (00119) *  VARIANCE W/ 5 BITS
02050 2D0CB2C1 (00120) VARS    DATA  0.56312E+01,  0.77983E+01,  0.98311E+01,  0.12057E+02
02052 3E62EB41
02054 4FA617C1
02056 6074BC41
02058 74624DC1 (00121)         DATA  0.14548E+02,  0.16994E+02,  0.19276E+02,  0.21426E+02
0205A 087F3B42
0205C 09A353C2
0205E 0AB68742
02060 0BB3D742 (00122)         DATA  0.23405E+02,  0.25415E+02,  0.27476E+02,  0.29409E+02
02062 0CB51FC2
02064 0DBCFDC2
02066 0EB45A42
02068 0F96F942 (00123)         DATA  0.31179E+02,  0.32888E+02,  0.34633E+02,  0.36477E+02
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0206A 1071A9C2
0206C 11510642
0206E 123D0F42
02070 13316842 (00124)          DATA  0.38386E+02,  0.40204E+02,  0.41864E+02,  0.43443E+02
02072 141A1CC2
02074 14FF97C2
02076 15B8B442
02078 167DB242 (00125)          DATA  0.44982E+02,  0.46483E+02,  0.47960E+02,  0.49431E+02
0207A 173DD2C2
0207C 17FAF142
0207E 18B72B42
02080 19733342 (00126)          DATA  0.50900E+02,  0.52334E+02,  0.53709E+02,  0.55072E+02
02082 1A2AC0C2
02084 1ADAC0C2
02086 1B893742
02088 1C3ED942 (00127)          DATA  0.56491E+02,  0.58016E+02,  0.59760E+02,  0.10000E+21
0208A 1D020C42
0208C 1DF147C2
0208E 2B5E3AD1
               (00128) *
               (00129) *  PITCH GAIN W/ 2 BITS
02090 3F75CD40 (00130) PGS      DATA  0.48797E+00,  0.66711E+00,  0.82399E+00,  0.10000E+21
02092 5563DC40
02094 697BB140
02096 2B5E3AD1
               (00131) *
               (00132) *  PITCH W/ 6 BITS
02098 0000     (00133) PITCHS  DATA 16D'0'
 ...
020A8 0001     (00134)          DATA 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19
020A9 0002
020AA 0003
020AB 0004
020AC 0005
020AD 0006
020AE 0007
020AF 0008
020B0 0009
020B1 000A
020B2 000B
020B3 000C
020B4 000D
020B5 000E
020B6 000F
```

```
020B7 0010
020B8 0011
020B9 0012
020BA 0013
020BB 0014      (00135)        DATA 20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35
020BC 0015
020BD 0016
020BE 0017
020BF 0018
020C0 0019
020C1 001A
020C2 001B
020C3 001C
020C4 001D
020C5 001E
020C6 001F
020C7 0020
020C8 0021
020C9 0022
020CA 0023
020CB 0024      (00136)        DATA 36,37,38,39,40,41,42,43,44,45,46,47
020CC 0025
020CD 0026
020CE 0027
020CF 0028
020D0 0029
020D1 002A
020D2 002B
020D3 002C
020D4 002D
020D5 002E
020D6 002F
020D7 0030      (00137)        DATA 48,48,49,49,50,50,51,51,52,52,53,53,54,54,55,55
020D8 0030
020D9 0031
020DA 0031
020DB 0032
020DC 0032
020DD 0033
020DE 0033
020DF 0034
020E0 0034
020E1 0035
020E2 0035
```

```
     020E3 0036
     020E4 0036
     020E5 0037
     020E6 0037
     020E7 0038      (00138)        DATA 56,56,57,57,58,58,59,59,60,60,61,61,62,62,63,63
     020E8 0038
     020E9 0039
     020EA 0039
     020EB 003A
     020EC 003A
     020ED 003B
     020EE 003B
     020EF 003C
     020F0 003C
     020F1 003D
     020F2 003D
     020F3 003E
     020F4 003E
     020F5 003F
     020F6 003F
     020F7 0800      (00139)        EVEN
     020F8 8450      (00140) INSTPS0 DATA INS0*D'512'+X'50',X'0000'
     020F9 0000
     020FA 9250      (00141) INSTPS1 DATA INS1*D'512'+X'50',X'0000'
     020FB 0000
                     (00142) *         >>>>> DEQUANTIZER THRESHOLDS...SEE MPDPPS.TXT <<<<<
                     (00143)        BUS 1
          000065F0 (00144)        #L=START
                     (00145)        EJECT
```

```
                        *
                        *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        *
                                  EVEN
    065F0 0000                    DATA QUANSSA                   START ADDRESS
    065F1 0084                    DATA QUANSSZ                   MODULE SIZE
                        QUANS     BEGIN APU(QUAN)
          00000000                $A=0
A00 065F2 08FF08FF      QUANSSA   MOV(IOA,M7)                    M7=2**(-15)=SA
A01 065F4 16A016A0                K(2,0)                         2.0
A02 065F6 16921692                MOV(A2),K(1,0)                 A2=LE,LO INCRE: BIAS
A03 065F8 08910891                MOV(R,A1)                      A1=1.0
A04 065FA 08980000                MOV(P,EXO)\NOP                 EXO=1.0
A05 065FC 08F008F0      INCSJ     MOV(IOA,A0)                    A0=X(J)
A06 065FE 90090008                JUMPC(BIASS,AF1)               AF1=0 THEN ADD BIAS
A07 065F0 08110811                MOV(ZERO,A1)                   END OF PARCORS,BIAS=0!
A08 065F2 41004100      BIASS     ADD(A0,A1)                     X(J) + BIAS
A09 065F4 08130853                MOV(ZERO,A3)\MOV(EXI,A3)       LE"=0;LO"=1
A0A 065F6 02700270                MOV(A0),R(A3)                  A0=X(J)+BIAS,LE";LO"
A0B 065F8 08F40000      LOOPS     MOV(IOA,A4)\NOP                A4=D(K)
A0C 065FA 000008F4                NOP\MOV(IOA,A4)                A4=D(K+1)
A0D 065FC 08880888                MOV(R,M3)                      LE'=LE"+2;LO'=LO"+2
A0E 065FE 4C134C13                MOV(A3),SUB(A0,A4)             LE',T(K);A3=LO',T(K+1)
A0F 06600 85E085E0                MUL(M3,M7)                     LE'*SA;LO'*SA
A10 06602 000008F6                NOP\MOV(IOA,A6)                A6=V(K)
A11 06604 08F60000                MOV(IOA,A6)\NOP                A6=V(K+1)
A12 06606 911F0017                JUMPS(T1S,T1)                  IF T1=1 THEN K
A13 06608 911F001C                JUMPS(T2S,T2)                  IF T2=1 THEN K+1
A14 0660A 20370000                CLEAR(W1)\NOP                  RELEASE APS INPUT
A15 0660C 42604260                ADD(A3,A2)                     LE'+2;LO'+2
A16 0660E 10000008                JUMP(LOOPS)                    TRY D(K+2) & D(K+3)
A17 06610 08B50000      T1S       MOV(P,A5)\NOP                  A5=LE'*SA
A18 06612 3AA049C0                ALIGN(A5)\SUB(A6,A1)           FORCE EXP->0;V(K)-BIAS
A19 06614 204A0000                SET(AF2)\NOP                   SHUTOFF APS LOOP
A1A 06616 089C089C                MOV(R,OO)                      OPRM(J);DEQ(OPRM(J))
A1B 06618 10370022                JUMP(AF3STST,W1),CLEAR         AF3=?,RELEASE APS INPUT
A1C 0661A 000008B5      T2S       NOP\MOV(P,A5)                  A5=LO'*SA
A1D 0661C 49C03AA0                SUB(A6,A1)\ALIGN(A5)           V(K+1)-BIAS;FORCE EXP->0
A1E 0661E 204A0000                SET(AF2)\NOP                   SHUTOFF APS LOOP
A1F 06620 0000089C                NOP\MOV(R,OO)                  OO=QPRM(J)
A20 06622 089C0000                MOV(R,OO)\NOP                  OO=DEQ(QPRM(J))
A21 06624 20370000                CLEAR(W1)\NOP                  RELEASE APS INPUT
A22 06626 90080005      AF3STST   JUMPC(INCSJ,AF3)               FOR PARCOR,DC,VAR & PG
A23 06628 000008F8      MQUANS    NOP\MOV(IOA,M0)                GET PITCH
```

```
A24 0662A 0000B460            NOP\MUL(M0,M7)           SA*PITCH
A25 0662C 000008B5            NOP\MOV(P,A5)            NOW "FIX" PITCH
A26 0662E 00003AA0            NOP\ALIGN(A5)            FORCE EXP->0
A27 06630 0000089C            NOP\MOV(R,OQ)            M->INSTRS0+1
A28 06632 901C002B     #1     JUMPC(#1,F0)             WAIT FOR OUTPUT TO CLEAR
A29 06634 20370000            CLEAR(WI)\NOP            RELEASE APS INPUT
A2A 06636 20500000            SET(RO)\NOP              RELEASE APS OUTPUT
A2B 06638 08FC0000            MOV(IQA,OQ)\NOP          OVERWRITE INS0
A2C 0663A 901C002C     #2     JUMPC(#2,F0)             WAIT FOR OUTPUT TO CLEAR
A2D 0663C 20370000            CLEAR(WI)\NOP            RELEASE APS INPUT
A2F 0663E 20500000            SET(RO)\NOP              RELEASE APS OUTPUT
A2F 06640 08DC0000            MOV(IQ,OQ)\NOP           OQ=Q(M)=QTM
A30 06642 000008FC            NOP\MOV(IQA,OQ)          QTM->INSTRS1+1
A31 06644 901C0031     #3     JUMPC(#3,F0)             WAIT FOR OUTPUT TO CLEAR
A32 06646 20370000            CLEAR(WI)\NOP            RELEASE APS INPUT
A33 06648 20500000            SET(RO)\NOP              RELEASE APS OUTPUT
A34 0664A 08FC0000            MOV(IQA,OQ)\NOP          OVERWRITE INS1
A35 0664C 901C0035     #4     JUMPC(#4,F0)             WAIT FOR OUTPUT TO CLEAR
A36 0664E 20370000            CLEAR(WI)\NOP            RELEASE APS INPUT
A37 06650 20500000            SET(RO)\NOP              RELEASE APS OUTPUT
A38 06652 08FC0000            MOV(IQA,OQ)\NOP          OQ=D(Q(M))=DTM
                       *
                       *  K->A TRANSFORM W/ ENG=SUM(1-K(I))**2
A39 06654 08F10000     KTOAS  MOV(IQA,A1)\NOP          P(1)
A3A 06656 0A200000            NEG(A1)\NOP              MAKE IT K(1)
A3B 06658 08B80000            MOV(R,M0)\NOP
A3C 0665A 08BF0000            MOV(R,M7)\NOP            K(1)**2 FOR ENERGY
A3D 0665C 08910000            MOV(R,A1)\NOP            SAVE K(1)
A3E 0665E 84600000            MUL(M0,M7)\NOP           SO SQUARE IT
A3F 06660 16801680            K(+1)                    NEED THIS AROUND, TOO
A40 06662 08D008D0            MOV(IQ,A0)               P(2)
A41 06664 08950000            MOV(R,A5)\NOP            1.0
A42 06666 08B608B6            MOV(P,A6)                K(1)^2
A43 06668 4FA04FA0            SUB(A5,A6)               1.0-K(1)^2
A44 0666A 020D0200            MOV(M5),R(A0)            PROD(1),GET K(2)
A45 0666C 08BF08BF            MOV(R,M7)                K(2)
A46 0666E 08B808BB            MOV(R,M3)                K(2)
A47 06670 3000006F            CALL(X23RD)              DO 2ND ITERATION (M=2)
A48 06672 3000006F            CALL(X23RD)              DO 3RD ITER (M=3)
A49 06674 30000069            CALL(X4TH)
A4A 06676 3000006A            CALL(X5TH)
A4B 06678 00000260            NOP\R(A3)                GET A(5)(3) READY
A4C 0667A 30000062            CALL(X6TH)               M=6
A4D 0667C 30000064            CALL(X7TH)               M=7
```

```
                                      NOP\R(A4)                       GET A[7](4) READY
                                      CALL(X8TH)
                                      MOV(IQ,M3)\NOP                  LTH2 (=SA)
                                      MUL(M3,M5)\NOP                  PROD(8)*LTH2
                            (00238)   R(A1)\NOP
                            (00239)   MOV(P,DQ)\NOP                   OUTPUT ENERGY = LTH2*PRO
                            (00240) ;                                 D(8)
                            (00241)   MOV(DQ),R(A2)\NOP               A(1) OUT
                            (00242)   MOV(DQ),R(A3)\NOP               A(2) OUT
                            (00243)   MOV(DQ),R(A4)\R(A4)             A(3) OUT
                            (00244)   MOV(R,DQ)\MOV(DQ),R(A3)         A(4) OUT,A(5) OUT
                   0000025C (00245)   NOP\MOV(DQ),R(A2)               A(6) OUT
                   0000024C (00246)   NOP\MOV(DQ),R(A1)               A(7) OUT
                   0000089C (00247)   NOP\MOV(R,DQ)                   A(8) OUT
                            (00248) *
A58 06698 20420000 (00249) DNFSA  CLEAR(RA)\NOP                       APU DONE!
A5C 0669A 00000000 (00250)        NOP
                   (00251) *
                   (00252) *  K->A APU SUBROUTINES
A5D 0669C 0000089B (00253) X8TH   NOP\MOV(R,FX0)                      \A[7](4)
A5E 0669E 08540854 (00254)        MOV(FX1,A4)                         A[7](4)
A5F 066A0 85800000 (00255)        MUL(M3,M4)\NOP                      A[M-1](M-4)*K[M] ((M=8))
A60 066A2 08800880 (00256)        MOV(P,A0)
                   (00257) *
A61 066A4 10000064 (00258)        JUMP(X7TH)
A62 066A6 0000089B (00259) X6TH   NOP\MOV(R,FX0)                      A[5](3)
A63 066A8 08530000 (00260)        MOV(FX1,A3)\NOP                     A[5](3)
A64 066AA 85608560 (00261) X7TH   MUL(M2,M7)\MUL(M2,M7)               A[M-1](M-3)*K[M]\A[M-1](
                   (00262) ;                                          3)*K[M]
A65 066AC 44000000 (00263)        ADD(A0,A4)\NOP                      SUM FOR A[M](4)
A66 066AE 08940000 (00264)        MOV(R,A4)\NOP                       STORE A[M](4)
A67 066B0 08800880 (00265)        MOV(P,A0)
                   (00266) *
A68 066B2 1000006A (00267)        JUMP(X5TH)
A69 066B4 08520000 (00268) X4TH   MOV(FX1,A2)\NOP                     A[3](2)
A6A 066B6 84F084F0 (00269) X5TH   MUL(M1,M7)\MUL(M1,M7)               A[M-1](M-2)*K[M]\A[M-1](
                   (00270) ;                                          2)*K[M]
A6B 066B8 43004300 (00271)        ADD(A0,A3)\ADD(A0,A3)               SUM FOR A[M](3)\A[M](M-3
                   (00272) ;                                          )
A6C 066BA 0898089B (00273)        MOV(R,FX0)\MOV(R,FX0)
A6D 066BC 084C084A (00274)        MOV(FX1,M4)\MOV(FX1,M2)             STORE A[M](M-3)\A[M](3)
A6E 066BE 08800880 (00275)        MOV(P,A0)
                   (00276) *
A6F 066C0 84608460 (00277) X23RD  MUL(M0,M7)\MUL(M0,M7)               A[M-1](M-1)*K[M]\A[M-1](
```

```
                       (00278) ;                                                            1)*K[M]
A70 066C2 42134214 (00279)        MOV(A3),ADD(A0,A2)\MOV(A4),ADD(A0,A2)        STORE A[M](3),SUM FOR A[
                       (00280) ;                                                            M](2)\A[M](M-3),SUM A[M]
                       (00281) ;                                                            (M-2)
A71 066C4 08980898 (00282)        MOV(R,FX0)\MOV(R,FX0)
A72 066C6 084A0849 (00283)        MOV(FX1,M2)\MOV(FX1,M1)                      ATORE A[M](M-2)\A[M](2)
A73 066C8 08B008B0 (00284)        MOV(P,A0)\MOV(P,A0)
A74 066CA 41124113 (00285)        MOV(A2),ADD(A0,A1)\MOV(A3),ADD(A0,A1)        STORE A[M](2),SUM FOR A[
                       (00286) ;                                                            M](1)\A[M](M-2),SUM A[M]
                       (00287) ;                                                            (M-1)
                       (00288) *
A75 066CC 85F085F0 (00289)        MUL(M3,M7)                                   K[M]^2
A76 066CE 08980898 (00290)        MOV(R,FX0)\MOV(R,FX0)
A77 066D0 08490848 (00291)        MOV(FX1,M1)\MOV(FX1,M0)                      A[M](M-1)\A[M](1)
A78 066D2 08910892 (00292)        MOV(R,A1)\MOV(R,A2)                          A[M](1)\A[M](M-1)
A79 066D4 08F708F7 (00293)        MOV(IOA,A7)                                  -A[M](M) (=P[M])
A7A 066D6 0AF00AF0 (00294)        NEG(A7)                                      MAKE IT REFLN COEF
A7B 066D8 08B608B6 (00295)        MOV(P,A6)                                    K[M]^2
A7C 066DA 4FA80891 (00296)        MOV(M0),SUB(A5,A6)\MOV(R,A1)                 K[M]=A[M](M),1-K[M]^2
A7D 066DC 08D708D7 (00297)        MOV(IO,A7)                                   P[M+1]
A7E 066DE 02E802E8 (00298)        MOV(M3),R(A7)                                1-K[M]^2,GET K[M+1]
A7F 066E0 85A085A0 (00299)        MUL(M3,M5)                                   (1-K[M]^2)*PROD
A80 066E2 08AD08AD (00300)        MOV(P,M5)                                    NEW PROD
A81 066E4 08B808B8 (00301)        MOV(R,M3)                                    K[M+1]
A82 066E6 08BF08BF (00302)        MOV(R,M7)                                    K[M+1]
A83 066E8 A000A000 (00303)        RETURN
                       (00304) *
          00000084 (00305)        QUANSSZ=*A-QUANSSA
    066EA              (00306)        END QUANSSZ
                       (00307)        EJECT
```

```
                      (00308) *
                      (00309) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                      (00310) *
                      (00311)          EVEN
    066FA 000067F2    (00312)          ADDR G105SI                    POINTER TO CONSTRUCTED I
                      (00313) ;                                       NSTRUCTION BLOCK
    066FC 000066F6    (00314)          ADDR G105S+2*SCLRS             POINTER TO SCALAR BLOCK
    066FE 0000        (00315)          DATA 0                         NUMBER OF SCALARS
    066FF 0102        (00316)          DATA G105SZ                    MODULE SIZE
    066F0 00006782    (00317)          ADDR G105SA                    POINTER TO CHAIN ANCHOR
                      (00318)          EVEN                           END ON WORD BOUNDARY
                      (00319) *
                      (00320) G105S    BEGIN APS(G105)
A00 066F2 00105340    (00321)          JSN(G105S1,P1)                 SET INPUT PC(PC1)
A01 066F4 02300030    (00322)          SET(R0)                        ENABLE APS OUTPUT
A02 066F6 04C203CF    (00323) SCLRS    LOAD(BR0,SAS38(1),TF)          IQ=2**(-15)
A03 066F8 06C60023    (00324)          LOAD(BR0,PARCS(3),TF)          IQ=P(1)
A04 066FA 08D41F40    (00325)          LOAD(BR1,PVECS1(2),TF)         IQ=PTHR(0)
A05 066FC 0A9A0002    (00326)          ADD(BR1,WS,TF)                 IQ=PTHR(1)
A06 066FE 0CF42134    (00327)          LOAD(BR3,PDEQS1(2),TF)         IQ=PDEQ(0)
A07 06700 0EBF0002    (00328)          ADD(BR3,WS,TF,C)               IQ=PDEQ(1),THEN PC1
                      (00329)
A08 06702 10BA0002    (00330)          ADD(BR0,WS,TF)                 IQ=P(2)
A09 06704 12D41F80    (00331)          LOAD(BR1,PVECS2(2),TF)         IQ=PTHR(0)
A0A 06706 149A0002    (00332)          ADD(BR1,WS,TF)                 IQ=PTHR(1)
A0B 06708 16F42174    (00333)          LOAD(BR3,PDEQS2(2),TF)         IQ=PDEQ(0)
A0C 0670A 18BF0002    (00334)          ADD(BR3,WS,TF,C)               IQ=PDEQ(1),THEN PC1
                      (00335) *
A0D 0670C 1ABA0002    (00336)          ADD(BR0,WS,TF)                 IQ=P(3)
A0E 0670E 1CD41FC0    (00337)          LOAD(BR1,PVECS3(2),TF)         IQ=PTHR(0)
A0F 06710 1E9A0002    (00338)          ADD(BR1,WS,TF)                 IQ=PTHR(1)
A10 06712 20F421B4    (00339)          LOAD(BR3,PDEQS3(2),TF)         IQ=PDEQ(0)
A11 06714 22BF0002    (00340)          ADD(BR3,WS,TF,C)               IQ=PDEQ(1),THEN PC1
                      (00341) *
A12 06716 24BA0002    (00342)          ADD(BR0,WS,TF)                 IQ=P(4)
A13 06718 26D41FF0    (00343)          LOAD(BR1,PVECS4(2),TF)         IQ=PTHR(0)
A14 0671A 289A0002    (00344)          ADD(BR1,WS,TF)                 IQ=PTHR(1)
A15 0671C 2AF421D4    (00345)          LOAD(BR3,PDEQS4(2),TF)         IQ=PDEQ(0)
A16 0671E 2CBF0002    (00346)          ADD(BR3,WS,TF,C)               IQ=PDEQ(1),THEN PC1
                      (00347) *
A17 06720 2EBA0002    (00348)          ADD(BR0,WS,TF)                 IQ=P(5)
A18 06722 30D42000    (00349)          LOAD(BR1,PVECS5(2),TF)         IQ=PTHR(0)
A19 06724 329A0002    (00350)          ADD(BR1,WS,TF)                 IQ=PTHR(1)
A1A 06726 34F421F4    (00351)          LOAD(BR3,PDEQS5(2),TF)         IQ=PDEQ(0)
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A1B 0672B 36BE0002 (00352)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00353) *
A1C 0672A 38BA0002 (00354)      ADD(BR0,WS,TF)                IQ=P(6)
A1D 0672C 3AD42010 (00355)      LOAD(BR1,PVECS6(2),TF)        IQ=PTHR(0)
A1E 0672E 3C9A0002 (00356)      ADD(BR1,WS,TF)                IQ=PTHR(1)
A1F 06730 3EF42204 (00357)      LOAD(BR3,PDEQS6(2),TF)        IQ=PDEQ(0)
A20 06732 40BE0002 (00358)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00359) *
A21 06734 42BA0002 (00360)      ADD(BR0,WS,TF)                IQ=P(7)
A22 06736 44D42020 (00361)      LOAD(BR1,PVECS7(2),TF)        IQ=PTHR(0)
A23 06738 469A0002 (00362)      ADD(BR1,WS,TF)                IQ=PTHR(1)
A24 0673A 48F42214 (00363)      LOAD(BR3,PDEQS7(2),TF)        IQ=PDEQ(0)
A25 0673C 4ABE0002 (00364)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00365) *
A26 0673E 4CBA0002 (00366)      ADD(BR0,WS,TF)                IQ=P(8)
A27 06740 4ED42028 (00367)      LOAD(BR1,PVECS8(2),TF)        IQ=PTHR(0)
A28 06742 509A0002 (00368)      ADD(BR1,WS,TF)                IQ=PTHR(1)
A29 06744 52F4221C (00369)      LOAD(BR3,PDEQS8(2),TF)        IQ=PDEQ(0)
A2A 06746 54300029 (00370)      SET(AF1)                      SET "END OF PARCOR" BIAS
A2B 06748 56BE0002 (00371)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00372) *
A2C 0674A 58C203EA (00373)      LOAD(BR0,SAS52(1),TF)         IQ=DC BIAS
A2D 0674C 5AD42030 (00374)      LOAD(BR1,DCS(2),TF)           IQ=PTHR(0)
A2E 0674E 5C9A0002 (00375)      ADD(BR1,WS,TF)                IQ=PTHR(1)
A2F 06750 5EF42224 (00376)      LOAD(BR3,DCSDEQ(2),TF)        IQ=PDEQ(0)
A30 06752 60BE0002 (00377)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00378) *
A31 06754 62C203E0 (00379)      LOAD(BR0,SAS55(1),TF)         IQ=VAR
A32 06756 64D42050 (00380)      LOAD(BR1,VARS(2),TF)          IQ=PTHR(0)
A33 06758 669A0002 (00381)      ADD(BR1,WS,TF)                IQ=PTHR(1)
A34 0675A 68F42244 (00382)      LOAD(BR3,VARSDEQ(2),TF)       IQ=PDEQ(0)
A35 0675C 6ABE0002 (00383)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00384) *
A36 0675E 6CC203EC (00385)      LOAD(BR0,SAS61(1),TF)         IQ=PG
A37 06760 6ED42090 (00386)      LOAD(BR1,PGS(2),TF)           IQ=PTHR(0)
A38 06762 709A0002 (00387)      ADD(BR1,WS,TF)                IQ=PTHR(1)
A39 06764 72F42284 (00388)      LOAD(BR3,PGSDEQ(2),TF)        IQ=PDEQ(0)
A3A 06766 7430002B (00389)      SET(AF3)                      GET READY TO TERMINATE
A3B 06768 76BE0002 (00390)      ADD(BR3,WS,TF,C)              IQ=PDEQ(1),THEN PC1
                   (00391) *
A3C 0676A 78C203EE (00392)      LOAD(BR0,SAS62(1),TF)         IQ=M
A3D 0676C 7A300037 (00393)      SET(W1)                       STALL APS INPUT
A3E 0676E 7C000020 (00394)      NOP                           RELEASED BY APU
A3F 06770 7EC420EB (00395)      LOAD(BR0,INSTRS0(2),TF)       IQ=INSTRS0
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```
A40 06772 B0300037 (00396)          SET(WI)                        STALL APS INPUT
A41 06774 B2642098 (00397)          LOAD(BR2,PITCHS(2))            PITCH(.) BA
A42 06776 B4500000 (00398) INS0     LOAD(BR1,MSS)                  APU SETS MSS->M
A43 06778 B7290028 (00399)          ADDB(BR2,BR1,TF)               IQ=QTM=PITCH(M)
A44 0677A B8300037 (00400)          SET(WI)                        STALL APS INPUT
A45 0677C BA000020 (00401)          NOP                            RELEASED BY APU
A46 0677E BCC420FA (00402)          LOAD(BR0,INSTRS1(2),TF)        IQ=INSTRS1
A47 06780 BE300037 (00403)          SET(WI)                        STALL APS INPUT
A48 06782 906422BC (00404)          LOAD(BR2,MSDEQ(2))             DEQ(.) BA
A49 06784 92500000 (00405) INS1     LOAD(BR1,MSS)                  APU SETS MSS->DTM
A4A 06786 94290028 (00406)          ADDB(BR2,BR1)                  DEQ(DTM)
A4B 06788 96A90028 (00407)          ADDB(BR2,BR1,TF)               IQ=DRM=DEQ(2*DTM)
                   (00408) *
A4C 0678A 98460021 (00409) KAS      LOAD(BR0,PARCS-2(3))           PARC(.) BA-2
A4D 0678C 9A500007 (00410)          LOAD(BR1,PSIZES)               PARC(.) SIZE-1
A4E 0678E 9CBA0002 (00411) PINCS1   ADD(BR0,WS,TF)                 IQ=PARC(I)
A4F 06790 9E194BB1 (00412)          SUBL(BR1,1),JUMPP(PINCS1)      FOR I=0,1...7
A50 06792 A0C2043A (00413)          LOAD(BR0,SAS92(1),TF)          IQ=LTH2
                   (00414) *
A51 06794 A2200031 (00415) DNES1    CLEAR(RI)                      INPUT DONE!
A52 06796 A4000020 (00416)          NOP
                   (00417) *
                   (00418) *  O/DO APS SUBROUTINE
A53 06798 A6205E40 (00419) G105S1   JSN(G105S0,P2)                 SET OUTPUT PC(P2)
A54 0679A A8005960 (00420) TOPSP1   JUMP(ENTRYS)                   ENTER @ STALL!
A55 0679C AA9A0002 (00421) ADDS1    ADD(BR1,WS,TF)                 IQ=D(K)
A56 0679E AC9A0002 (00422)          ADD(BR1,WS,TF)                 IQ=D(K+1)
A57 067A0 AEBA0002 (00423)          ADD(BR3,WS,TF)                 IQ=V(K)
A58 067A2 B0BA0002 (00424)          ADD(BR3,WS,TF)                 IQ=V(K+1)
A59 067A4 B2300037 (00425) ENTPYS   SET(WI)                        WAIT FOR THRESHOLD ...
A5A 067A6 B4000020 (00426)          NOP                            DECISION
A5B 067A8 B60055AA (00427)          JUMPC(ADDS1,AF2)               AF2=0 THEN K+2,K+3
A5C 067AA B82E0000 (00428)          ADD(BR2,MSS,NA,C)              AF2=1,THEN PC0->PC
A5D 067AC BA20546A (00429)          JUMP(TOPSP1,AF2),CLEAR         RESET LOOP PC & AF2
                   (00430) *
A5E 067AE BC307C40 (00431) G105S0   JSN(G105S3,P3)                 SET OUTPUT PC(PC3)
A5F 067B0 BE500007 (00432) TOPSP2   LOAD(BW1,PSIZES)               P(.) SIZE-1
A60 067B2 C0400000 (00433)          LOAD(BW0,[0])                  QPRM(.) BA
A61 067B4 C2700000 (00434)          LOAD(BW3,MSS)                  DUMMY OP FOR EXEC
A62 067B6 C4020000 (00435)          SUB(BW0,MSS)                   QPRM(.) BA-1
A63 067B8 C6660021 (00436)          LOAD(BW2,PARCS-2(3))           P(.) BA-2
A64 067BA C90A0001 (00437) #3       ADD(BW0,HS,TE)                 OQ=QPRM(I)
A65 067BC CAAA0002 (00438)          ADD(BW2,WS,TE)                 OQ=DEQ(QPRM(I))
A66 067BE CC1164B1 (00439)          SUBL(BW1,1),JUMPP(#3)          FOR I=1,2...8
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A67 067C0 CF442F31 (00440)          LOAD(BW0,QPRMS+DCPOS(2),TE)         OO=DEQ(DC)=QTDC
A68 067C2 D0F20432 (00441)          LOAD(BW2,SASB8(1),TE)               OO=DEQ. DCBIAS
A69 067C4 D3442F30 (00442)          LOAD(BW0,QPRMS+VARPOS(2),TE)        OO=DEQ(VAR)=QTVAR
A6A 067C6 D4F20434 (00443)          LOAD(BW2,SASB9(1),TE)               OO=DEQ. VAR.
A6B 067C8 D7442F34 (00444)          LOAD(BW0,QPRMS+PGPOS(2),TE)         OO=DEQ(PG)=QTG
A6C 067CA D8F20436 (00445)          LOAD(BW2,SAS90(1),TE)               OO=DEQ. PG.
A6D 067CC DA6420F8 (00446)          LOAD(BW2,INSTRS0(2))                OVERWRITE INSTRS0+1
A6E 067CE DD2F0001 (00447)          ADD(BW2,HS,TE,C)                    AND CHANGE PC TO STALL
A6F 067D0 DE73FFC0 (00448)          LOAD(BW3,APSSMEM(1))                OVERWRITE INS0
A70 067D2 F0BF0000 (00449)          ADD(BW3,MSS,TE,C)                   AND CHANGE PC TO STALL
A71 067D4 F3442F32 (00450)          LOAD(BW0,QPRMS+MPOS(2),TE)          OO=DEQ(M)=QTM
A72 067D6 F52F0002 (00451)          ADD(BW2,WS,TE,C)                    OVERWRITE INSTRS1+1
A73 067D8 F6BF0000 (00452)          ADD(BW3,MSS,TE,C)                   OVERWRITE INS1
A74 067DA F8F20438 (00453)          LOAD(BW2,SAS91(1),TE)               OO=DEQ. PITCH.
                   (00454) *
A75 067DC FA460010 (00455)          LOAD(BW0,A1S-2(3))                  A1(.) BA-2
A76 067DE FC500007 (00456)          LOAD(BW1,FSIZES)                    A1(.) SIZE-1
A77 067E0 FFF203FA (00457)          LOAD(BW2,SAS60(1),TE)               OO=PROD(8)=FNG
A78 067E2 F0BA0002 (00458) PINCSJ   ADD(BW0,WS,TE)                      OO=A(J)
A79 067E4 F21178B1 (00459)          SUBL(BW1,1),JUMPP(PINCSJ)           FOR J=0,1,...7
                   (00460) *
A7A 067E6 F4200030 (00461) DNFS0    CLEAR(R0)                           OUTPUT DONE!
A7B 067E8 F6000020 (00462)          NOP
                   (00463) *
                   (00464) *  O/DO APS OUTPUT SUBROUTINE
A7C 067EA F8300032 (00465) G105S3   SET(RA)                             ENABLE APU
A7D 067EC FA200030 (00466) TOPSP3   CLEAR(R0)                           STALL APS OUTPUT
A7E 067EE FC2F0000 (00467)          ADD(BW2,MSS,NA,C)                   PC2->PC
A7F 067F0 FE007D60 (00468)          JUMP(TOPSP3)                        RESET LOOP PC
                   (00469) *
        000067B2   (00470)          G105SA= #C                          ASSIGN VALUE TO CHAIN AN
                   (00471) ;                                            CHOR
    067F2          (00472)          END #A-1
                   (00473) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    067F2 00000000 (00474) G105S1   DATA 1F'0,0'
          00000102 (00475)          G105SZ=#L-G105S
    067F4          (00476)          END
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AIS:        00012 (00006) (00455)
ADDS1:      00055 (00421) (00427)
AF3STST:    00022 (00181) (00188)
AFDTSORG:   008FH (00007) (00054)
APSSMEM:    1FFC0 (00008) (00448)
BIASS:      00008 (00160) (00162)
CSPUSNOS:   021FC (00009) (00057)
DCS:        02030 (00114) (00374)
DCSDEQ:     02224 (00025) (00376)
DCPOS:      00009 (00010) (00440)
DNFSA:      0005H (00249)
DNFS1:      00051 (00415)
DNFS0:      0007A (00461)
ENTRYS:     00059 (00420) (00425)
G105S:      066F2 (00056) (00314) (00320) (00475)
G105S1:     00053 (00321) (00419)
G105S3:     0007C (00431) (00465)
G105SA:     067H2 (00317) (00470)
G105SI:     067F2 (00312) (00474)
G105S0:     0005F (00419) (00431)
G105SZ:     00102 (00316) (00475)
HS:         00001 (00012) (00437) (00447)
INS0:       00042 (00140) (00398)
INS1:       00049 (00141) (00405)
INCSJ:      00005 (00159) (00188)
INSTRS0:    020FH (00140) (00395) (00446)
INSTRS1:    020FA (00141) (00402)
KAS:        0004C (00409)
KTOAS:      00039 (00213)
LOOPS:      00006 (00165) (00176)
MS:         00000 (00013)
MSS:        00000 (00014) (00398) (00405) (00428) (00434) (00435) (00449) (00452) (00467)
MSDEQ:      0228C (00028) (00404)
MPOS:       0000A (00015) (00450)
MQUANS:     00023 (00189)
PARCS:      00023 (00030) (00324) (00409) (00436)
PDEQS1:     02134 (00017) (00327)
PDEQS2:     02174 (00018) (00333)
PDEQS3:     021H4 (00019) (00339)
PDEQS4:     021D4 (00020) (00345)
PDEQS5:     021F4 (00021) (00351)
PDEQS6:     02204 (00022) (00357)
PDEQS7:     02214 (00023) (00363)
PDEQS8:     0221C (00024) (00369)
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PGS:       02090 (00130) (00386)
PGSDFO:    02284 (00027) (00388)
PGPOS:     0000C (00016) (00444)
PINCS1:    0004E (00411) (00412)
PINCSJ:    00078 (00458) (00459)
PITCHS:    02098 (00133) (00397)
PSIZES:    00007 (00031) (00410) (00432) (00456)
PVECS1:    01F40 (00068) (00325)
PVECS2:    01F80 (00078) (00331)
PVECS3:    01FC0 (00088) (00337)
PVECS4:    01FF0 (00094) (00343)
PVECS5:    02000 (00100) (00349)
PVECS6:    02010 (00104) (00355)
PVECS7:    02020 (00108) (00361)
PVECS8:    02028 (00111) (00367)
QPRMS:     02F28 (00032) (00440) (00442) (00444) (00450)
QUANS:     065F2 (00055) (00152)
QUANSSA:   00000 (00150) (00154) (00305)
QUANSSZ:   00084 (00151) (00305) (00306)
SAS104:    00452 (00046)
SAS11:     00398 (00033)
SAS38:     003CF (00034) (00323)
SAS39:     003D0 (00035)
SAS52:     003EA (00036) (00373)
SAS55:     003F0 (00037) (00379)
SAS60:     003FA (00038) (00457)
SAS61:     003FC (00039) (00385)
SAS62:     003FF (00040) (00392)
SAS88:     00432 (00041) (00441)
SAS89:     00434 (00042) (00443)
SAS90:     00436 (00043) (00445)
SAS91:     00438 (00044) (00453)
SAS92:     0043A (00045) (00413)
SCLRS:     00002 (00314) (00323)
START:     065F0 (00047) (00144)
SVTS:      00382 (00029) (00033) (00034) (00035) (00036) (00037) (00038) (00039) (00040) (00041)
                 (00042) (00043) (00044) (00045) (00046)
T1S:       00017 (00172) (00177)
T2S:       0001C (00173) (00182)
TOPSP1:    00054 (00420) (00429)
TOPSP2:    0005F (00432)
TOPSP3:    0007D (00466) (00468)
VARS:      02050 (00120) (00380)
VARSDFO:   02244 (00026) (00382)
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VARPOS:    0000B (00049) (00442)
VPOS:      0000B (00048)
WS:        00002 (00050) (00326) (00328) (00330) (00332) (00334) (00336) (00338) (00340) (00342)
                 (00344) (00346) (00348) (00350) (00352) (00354) (00356) (00358) (00360) (00362)
                 (00364) (00366) (00368) (00371) (00375) (00377) (00381) (00383) (00387) (00390)
                 (00411) (00421) (00422) (00423) (00424) (00438) (00451) (00458)
X23RD:     0006F (00227) (00228) (00277)
X4TH:      00069 (00229) (00268)
X5TH:      0006A (00230) (00267) (00269)
X6TH:      00062 (00232) (00259)
X7TH:      00064 (00233) (00258) (00261)
X8TH:      0005D (00235) (00253)
Z8:        00003 (00051)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   F-    0
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                    (00001) *  FCB 243... "MPDQPP(Y,U,V)"      DEQUANTIZE SIDEBAND
                    (00002) *                                  W/ K->A TRANSFORM
                    (00003) *                                  ORIGINATED:13-AUG-79
                    (00004) *                                  UPDATED:16-MAY-80
                    (00005) *  DEFINE GLOBAL SYMBOLS
          00000012  (00006)         A1S=D'18'
          000008EB  (00007)         AFDTSORG=$8EB
          0001FFC0  (00008)         APSSMEM=$1FFC0
          000021FC  (00009)         CSPUSNOS=$21FC
          00000003  (00010)         BM=3
          00000001  (00011)         US=1
          00000000  (00012)         MS=0
          00000000  (00013)         MSS=0
          00000023  (00014)         PARCS=D'35'
          00000007  (00015)         PSIZES=D'8'-D'1'
                    (00016) *  OBPRM=>OPRM
          00002E36  (00017)         OPRMS=D'11830'
          000003B2  (00018)         SVTS=$03B2
          000003C8  (00019)         SAS11=SVTS+2*D'11'
          00000400  (00020)         SAS39=SVTS+2*D'39'
          0000042A  (00021)         SAS60=SVTS+2*D'60'
          00000432  (00022)         SAS88=SVTS+2*D'88'
          00000434  (00023)         SAS89=SVTS+2*D'89'
          00000436  (00024)         SAS90=SVTS+2*D'90'
          00000438  (00025)         SAS91=SVTS+2*D'91'
          0000043A  (00026)         SAS92=SVTS+2*D'92'
          00006800  (00027)         START=$6800
          00000002  (00028)         WS=2
          00000003  (00029)         ZS=3
                    (00030) *
                    (00031) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
          0000089A  (00032)         *L=AFDTSORG+3*2*(243-128)                      FCB 243
00089A 001F6802     (00033)         ADDR DEQUS(R7,1)
00089C 001F68C4     (00034)         ADDR G106S(R7,1)
00089E 001021FC     (00035)         ADDR CSPUSNOS(,1,0)
                    (00036)         EJECT
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                      (00037) *
                      (00038) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                      (00039) *
                      (00040)          BUS 2
             00002134 (00041)          #I=0'B500'
                      (00042)          EVEN
                      (00043) *
                      (00044) *  PARCOR(1) W/ 5 BITS
02134 107BE6BE (00045) PDECS1  DATA  0.80431E-02,  0.24740E-01,  0.42199E-01,  0.60427E-01
02136 32AAE2BE
02138 566C6DBE
0213A 78C126BE
0213C 0A2D72C0 (00046)         DATA  0.79512E-01,  0.10024E+00,  0.12414E+00,  0.14986E+00
0213E 0CD4AA40
02140 0FE301C0
02142 132F9CC0
02144 16B39040 (00047)         DATA  0.17589E+00,  0.20368E+00,  0.23451E+00,  0.26811E+00
02146 1A122FC0
02148 1E046C40
0214A 22516DC0
0214C 26E9CCC0 (00048)         DATA  0.30401E+00,  0.34440E+00,  0.39167E+00,  0.44480E+00
0214E 2C154CC0
02150 32223E40
02152 38EE34C0
02154 412641C0 (00049)         DATA  0.50898E+00,  0.57740E+00,  0.65201E+00,  0.74030E+00
02156 49EB3E40
02158 53751040
0215A 5EC22640
0215C 66B30B40 (00050)         DATA  0.80236E+00,  0.88455E+00,  0.97486E+00,  0.10631E+01
0215E 713BEF40
02160 7CCB3640
02162 0BB13AC1
02164 0971A9C1 (00051)         DATA  0.11805E+01,  0.13001E+01,  0.13851E+01,  0.15023E+01
02166 0A669AC1
02168 0B14AE41
0216A 0C04B5C1
0216C 0CA40D41 (00052)         DATA  0.15805E+01,  0.17080E+01,  0.18691E+01,  0.19972E+01
0216E 0DA9EEC1
02170 0EE3EAC1
02172 0EEA43C1
                      (00053) *
                      (00054) *  PARCOR(2) W/ 5 BITS
02174 0B25EEC0 (00055) PDECS2  DATA  0.87097E-01,  0.26319E+00,  0.36928E+00,  0.46156E+00
02176 21B035C0
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02178 2E449140
0217A 3B1465C0
0217C 4736 7A40 (00056)         DATA  0.55635E+00,  0.62403E+00,  0.68141E+00,  0.73631E+00
0217E 4EF03740
02180 573B7140
02182 5E3E67C0
02184 65532640 (00057)         DATA  0.79160E+00,  0.84597E+00,  0.90653E+00,  0.97650E+00
02186 6C48BEC0
02188 74092CC0
0218A 7CEDF3C0
0218C 08624DC1 (00058)         DATA  0.10480E+01,  0.11214E+01,  0.12027E+01,  0.12736E+01
0218E 08FBA0C1
02190 099E2141
02192 0A305541
02194 0AB4D6C1 (00059)         DATA  0.13383E+01,  0.14072E+01,  0.14643E+01,  0.15197E+01
02196 0B41F241
02198 0BB6E2C1
0219A 0C2B5841
0219C 0C97BD41 (00060)         DATA  0.15740E+01,  0.16295E+01,  0.16759E+01,  0.17142E+01
0219E 0D093741
021A0 0D6B3F41
021A2 0DB6AE41
021A4 0E00D1C1 (00061)         DATA  0.17504E+01,  0.17863E+01,  0.18208E+01,  0.18521E+01
021A6 0E4A57C1
021A8 0E90EFC1
021AA 0ED119C1
021AC 0F0D1B41 (00062)         DATA  0.18814E+01,  0.19108E+01,  0.19426E+01,  0.19807E+01
021AE 0F4951C1
021B0 0F8A71C1
021B2 0FDB7941
               (00063) *
               (00064) *  PARCOR(3) W/ 4 BITS
021B4 1E7B0B40 (00065) PDECS3  DATA  0.23813E+00,  0.39243E+00,  0.51204E+00,  0.61256E+00
021B6 323B2540
021B8 41BAB6C0
021BA 4E685DC0
021BC 59EBD8C0 (00066)         DATA  0.70251E+00,  0.78737E+00,  0.86998E+00,  0.95262E+00
021BE 64CBBA40
021C0 6E5BB140
021C2 79EE73C0
021C4 084AC0C1 (00067)         DATA  0.10365E+01,  0.11226E+01,  0.12129E+01,  0.13086E+01
021C6 08EB15C1
021C8 09B404C1
021CA 0A7B0341
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PAGE    4:      FCH 243... "MPDQPP(Y,U,V)"      DEQUANTIZE SIDEBAND

021CC 08428E41 (00068)          DATA  0.14075E+01,  0.15162E+01,  0.16545E+01,  0.18438E+01
021CE 0C212D41
021D0 0D3C6A41
021D2 0FC01A41
                (00069) *
                (00070) *  PARCOR(4) W/ 4 BITS
021D4 2E34C1C0 (00071) PDECS4  DATA  0.31411E+00,  0.50442E+00,  0.63992E+00,  0.75167E+00
021D6 4090D5C0
021D8 51EBE640
021DA 6036B8C0
021DC 6CE50C40 (00072)          DATA  0.85074E+00,  0.94305E+00,  0.10322E+01,  0.11205E+01
021DE 7885ECC0
021E0 0841F241
021E2 08E6C8C1
021E4 09ACD9C1 (00073)          DATA  0.12094E+01,  0.13000E+01,  0.13929E+01,  0.14888E+01
021E6 0A666641
021E8 0B24A8C1
021EA 0BE90EC1
021EC 0C85DCC1 (00074)          DATA  0.15888E+01,  0.16951E+01,  0.18129E+01,  0.19500E+01
021EE 0D8E90C1
021F0 0E80D1C1
021F2 0F9999C1
                (00075) *
                (00076) *  PARCOR(5) W/ 3 BITS
021F4 38E90940 (00077) PDECS5  DATA  0.44510E+00,  0.66865E+00,  0.82476E+00,  0.95821E+00
021F6 559652C0
021F8 6991BC40
021FA 7AA6A040
021FC 08AFEC41 (00078)          DATA  0.10859E+01,  0.12194E+01,  0.13739E+01,  0.15907E+01
021FE 09C154C1
02200 0AFDBE41
02202 0CB9C0C1
                (00079) *
                (00080) *  PARCOR(6) W/ 3 BITS
02204 3B2210C0 (00081) PDECS6  DATA  0.46200E+00,  0.68463E+00,  0.84172E+00,  0.97631E+00
02206 57A1F4C0
02208 6BBD7B40
0220A 7CE7B9C0
0220C 08D70A41 (00082)          DATA  0.11050E+01,  0.12400E+01,  0.13980E+01,  0.16206E+01
0220E 09EB8541
02210 0B2F1AC1
02212 0CF6FD41
                (00083) *
                (00084) *  PARCOR(7) W/ 2 BITS
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02214 320DACC0 (00085) PDECS7  DATA  0.39739E+00,  0.73761E+00,  0.10127E+01,  0.13204E+01
02216 5E6A0140
02218 2B1A0241
0221A 0A902DC1
               (00086) *
               (00087) *  PARCOR(8) W/ 2 BITS
0221C 4A0E4140 (00088) PDECS8  DATA  0.57856E+00,  0.86541E+00,  0.11045E+01,  0.13815E+01
0221E 6EC5C140
02220 08D60431
02222 0600 4FC1
               (00089) *
               (00090) *  DC BIAS W/ 4 BITS
02224 7F937B0E (00091) DCS     DATA  0.62293E-01,  0.18721E+00,  0.31317E+00,  0.44096E+00
02226 17E67F40
02228 2815E140
0222A 387160C0
0222C 492838C0 (00092)         DATA  0.57154E+00,  0.70609E+00,  0.84579E+00,  0.99227E+00
0222E 5A612840
02230 6C42E8C0
02232 7E07B3C0
02234 092F1441 (00093)         DATA  0.11475E+01,  0.13143E+01,  0.14964E+01,  0.16991E+01
02236 0A83AEC1
02238 0BE8A0C1
0223A 0D97C1C1
0223C 0F74B7C1 (00094)         DATA  0.19319E+01,  0.22117E+01,  0.25759E+01,  0.31324E+01
0223E 11B1BEC1
02240 14987141
02242 190F27C1
               (00095) *
               (00096) *  VARIANCE W/ 5 BITS
02244 23AF1441 (00097) VARS    DATA  0.44600E+01,  0.68023E+01,  0.87943E+01,  0.10868E+02
02246 366B1C41
02248 465AB9C1
0224A 56F1A9C1
0224C 69E9DB41 (00098)         DATA  0.13247E+02,  0.15849E+02,  0.18140E+02,  0.20412E+02
0224E 7ECAC041
02250 0911FBC2
02252 0A34BC42
02254 0B3B3142 (00099)         DATA  0.22439E+02,  0.24372E+02,  0.26458E+02,  0.28495E+02
02256 0C2F9DC2
02258 0D3A9FC2
0225A 0E3E5C32
0225C 0F293742 (00100)         DATA  0.30322E+02,  0.32035E+02,  0.33741E+02,  0.35525E+02
0225E 10047AC2
```

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064
UNCLASSIFIED NL

```
02260 10DFD942
02262 11C33342
02264 12870A42 (00101)        DATA  0.37430E+02,  0.39343E+02,  0.41065E+02,  0.42664E+02
02266 13AEF742
02268 14885IC2
0226A 1554FDC2
0226C 161C6A42 (00102)        DATA  0.44222E+02,  0.45741E+02,  0.47224E+02,  0.48695E+02
0226E 16DFD942
02270 179CAC42
02272 185BF5C2
02274 19156042 (00103)        DATA  0.50167E+02,  0.51633E+02,  0.53034E+02,  0.54385E+02
02276 19D10642
02278 1A845A42
0227A 1B3147C2
0227C 1BF10642 (00104)        DATA  0.55758E+02,  0.57223E+02,  0.58810E+02,  0.60709E+02
0227E 1C9CB842
02280 1D67AF42
02282 1E5AC0C2
               (00105) *
               (00106) *  PITCH GAIN W/ 2 BITS
02284 32219640 (00107) PGAINS  DATA  0.39165E+00,  0.58430E+00,  0.74993E+00,  0.89805E+00
02286 4ACA57C0
02288 5FFDB4C0
0228A 72F34D40
               (00108) *
               (00109) *  PITCH W/ 6 BITS
0228C 78000041 (00110) MSDFC   DATA 15.
0228E 08000042 (00111)     DATA 16.,17.,18.,19.,20.,21.,22.,23.,24.,25.,26.,27.,28.,29.,30.,31.
02290 08800042
02292 09000042
02294 09800042
02296 0A000042
02298 0A800042
0229A 0B000042
0229C 0B800042
0229E 0C000042
022A0 0C800042
022A2 0D000042
022A4 0D800042
022A6 0E000042
022A8 0E800042
022AA 0F000042
022AC 0F800042
022AE 10000042 (00112)     DATA 32.,33.,34.,35.,36.,37.,38.,39.,40.,41.,42.,43.,44.,45.,46.,47.
```

```
022B0 10800042
022B2 11000042
022B4 11800042
022B6 12000042
022B8 12800042
022BA 13000042
022BC 13800042
022BE 14000042
022C0 14800042
022C2 15000042
022C4 15800042
022C6 16000042
022C8 16800042
022CA 17000042
022CC 17800042
022CE 18000042 (00113)      DATA 48.,49.,50.,51.,52.,53.,54.,55.,56.,57.,58.,59.,60.,61.,62.
022D0 18800042
022D2 19000042
022D4 19800042
022D6 1A000042
022D8 1A800042
022DA 1B000042
022DC 1B800042
022DE 1C000042
022E0 1C800042
022E2 1D000042
022E4 1D800042
022E6 1E000042
022E8 1E800042
022EA 1F000042
022EC 1F800042 (00114)      DATA 63.,65.,67.,69.,71.,73.,75.,77.,79.,81.,83.,85.,87.,89.,91.,93.
022EE 20800042
022F0 21800042
022F2 22800042
022F4 23800042
022F6 24800042
022F8 25800042
022FA 26800042
022FC 27800042
022FE 28800042
02300 29800042
02302 2A800042
02304 2B800042
02306 2C800042
```

```
02308 2D800042
0230A 2E800042
               (00115)        EVEN
0230C 5450     (00116) INSTRSO DATA INSO*D'512'+X'50',X'0000'
0230D 0000
               (00117)        BUS 1
      00006800 (00118)        #L=START
               (00119)        EJECT
```

```
                        (00120) *
                        (00121) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00122) *
                        (00123)          EVEN
    06800 0000          (00124)          DATA DEQUSSA                                  START ADDRESS
    06801 005D          (00125)          DATA DEQUSSZ                                  MODULE SIZE
                        (00126) DEQUS    BEGIN APU(DEQU)
          00000000      (00127)          #A=0
A00 06802 00000000      (00128) DEQUSSA  NOP                                           FOR TIMING PULSE OR CSPU
A01 06804 16801680      (00129)          K(1.0)                                        R=1.0
A02 06806 08910891      (00130)          MOV(R,A1)                                     A1=1.0(BIAS FOR PARCORS)
A03 06808 08FC0000      (00131) INCSJ    MOV(IQA,OQ)\NOP                               LEVEL->INSTRSO+1
A04 0680A 901C0004      (00132) #1       JUMPC(#1,EO)                                  WAIT FOR OUTPUT TO CLEAR
A05 0680C 20370000      (00133)          CLEAR(WI)\NOP                                 RELEASE APS INPUT
A06 0680E 20500000      (00134)          SET(RO)\NOP                                   RELEASE APS OUTPUT
A07 06810 08FC0000      (00135)          MOV(IQA,OQ)\NOP                               OVERWRITE INSO
A08 06812 901C0008      (00136) #2       JUMPC(#2,EO)                                  WAIT FOR OUTPUT TO CLEAR
A09 06814 20370000      (00137)          CLEAR(WI)\NOP                                 RELEASE APS INPUT
A0A 06816 08F00000      (00138)          MOV(IQA,A0)\NOP                               A0=DEQ(I)
A0B 06818 9009000D      (00139)          JUMPC(BIASS,AF1)                              END OF PARCORS?
A0C 0681A 08110000      (00140)          MOV(ZERO,A1)\NOP                              YES,REMOVE BIAS
A0D 0681C 49000000      (00141) BIASS    SUB(A0,A1)\NOP                                DEQ(I)-BIAS
A0E 0681E 20500000      (00142)          SET(RO)\NOP                                   RELEASE APS OUTPUT
A0F 06820 089C0000      (00143)          MOV(R,OQ)\NOP                                 OQ=D(QPRM(I))
A10 06822 90160003      (00144)          JUMPC(INCSJ,FWI)                              FOR K(J),J=1,...,8;DC,VAR
                        (00145) ;                                                      ,PG,M
A11 06824 20372037      (00146)          CLEAR(WI)                                     RELEASE APS INPUT
                        (00147) *
A12 06826 08F10000      (00148) KTOAS    MOV(IQA,A1)\NOP                               P(1)
A13 06828 0A200000      (00149)          NEG(A1)\NOP                                   MAKE IT K(1)
A14 0682A 08880000      (00150)          MOV(R,M0)\NOP
A15 0682C 088F0000      (00151)          MOV(R,M7)\NOP                                 K(1)**2 FOR ENERGY
A16 0682E 08910000      (00152)          MOV(R,A1)\NOP                                 SAVE K[1]
A17 06830 84600000      (00153)          MUL(M0,M7)\NOP                                SO SQUARE IT
A18 06832 16801680      (00154)          K(+1)                                         NEED THIS AROUND, TOO
A19 06834 08D008D0      (00155)          MOV(IQ,A0)                                    P(2)
A1A 06836 08950000      (00156)          MOV(R,A5)\NOP                                 1.0
A1B 06838 08B608B6      (00157)          MOV(P,A6)                                     K[1]^2
A1C 0683A 4EA04EA0      (00158)          SUB(A5,A6)                                    1.0-K[1]^2
A1D 0683C 020D020D      (00159)          MOV(M5),R(A0)                                 PROD(1),GET K[2]
A1E 0683E 088F088F      (00160)          MOV(R,M7)                                     K[2]
A1F 06840 088B088B      (00161)          MOV(R,M3)                                     K[2]
A20 06842 30000048      (00162)          CALL(X23RD)                                   DO 2ND ITERATION (M=2)
A21 06844 30000048      (00163)          CALL(X23RD)                                   DO 3RD ITER (M=3)
```

```
A22 06846 30000042 (00164)          CALL(X4TH)
A23 06848 30000043 (00165)          CALL(X5TH)
A24 0684A 00000260 (00166)          NOP\R(A3)                    GET A[5](3) READY
A25 0684C 3000003B (00167)          CALL(X6TH)                   M=6
A26 0684E 3000003D (00168)          CALL(X7TH)                   M=7
A27 06850 00000280 (00169)          NOP\R(A4)                    GET A[7](4) READY
A28 06852 30000036 (00170)          CALL(X8TH)
A29 06854 08CB0000 (00171)          MOV(1Q,M3)\NOP               LTH2 (=SA)
A2A 06856 85A00000 (00172)          MUL(M3,M5)\NOP               PROD(8)*LTH2
A2B 06858 02200000 (00173)          R(A1)\NOP
A2C 0685A 08BC0000 (00174)          MOV(P,OQ)\NOP                OUTPUT ENERGY = LTH2*PRO
                   (00175) ;                                     D(8)
A2D 0685C 025C0000 (00176)          MOV(OQ),R(A2)\NOP            A(1) OUT
A2E 0685E 027C0000 (00177)          MOV(OQ),R(A3)\NOP            A(2) OUT
A2F 06860 029C0280 (00178)          MOV(OQ),R(A4)\R(A4)          A(3) OUT
A30 06862 089C027C (00179)          MOV(R,OQ)\MOV(OQ),R(A3)      A(4) OUT,A(5) OUT
A31 06864 0000025C (00180)          NOP\MOV(OQ),R(A2)            A(6) OUT
A32 06866 0000023C (00181)          NOP\MOV(OQ),R(A1)            A(7) OUT
A33 06868 0000089C (00182)          NOP\MOV(R,OQ)                A(8) OUT
                   (00183) *
A34 0686A 20320000 (00184) DNFSA    CLEAR(RA)\NOP                APU DONE!
A35 0686C 00000000 (00185)          NOP
                   (00186) *
                   (00187) *  K->A APU SUBROUTINES
A36 0686E 0000089B (00188) X8TH     NOP\MOV(R,EXO)               \A[7](4)
A37 06870 08540854 (00189)          MOV(EXI,A4)                  A[7](4)
A38 06872 85800000 (00190)          MUL(M3,M4)\NOP               A[M-1](M-4)*K[M] ((M=8))
A39 06874 088008B0 (00191)          MOV(P,A0)
                   (00192) *
A3A 06876 1000003D (00193)          JUMP(X7TH)
A3B 06878 0000089B (00194) X6TH     NOP\MOV(R,EXO)               A[5](3)
A3C 0687A 08530000 (00195)          MOV(EXI,A3)\NOP              A[5](3)
A3D 0687C 85608560 (00196) X7TH     MUL(M2,M7)\MUL(M2,M7)        A[M-1](M-3)*K[M]\A[M-1](
                   (00197) ;                                     3)*K[M]
A3E 0687E 44000000 (00198)          ADD(A0,A4)\NOP               SUM FOR A[M](4)
A3F 06880 08940000 (00199)          MOV(R,A4)\NOP                STORE A[M](4)
A40 06882 088008B0 (00200)          MOV(P,A0)
                   (00201) *
A41 06884 10000043 (00202)          JUMP(X5TH)
A42 06886 08520000 (00203) X4TH     MOV(EXI,A2)\NOP              A[3](2)
A43 06888 84F084F0 (00204) X5TH     MUL(M1,M7)\MUL(M1,M7)        A[M-1](M-2)*K[M]\A[M-1](
                   (00205) ;                                     2)*K[M]
A44 0688A 43004300 (00206)          ADD(A0,A3)\ADD(A0,A3)        SUM FOR A[M](3)\A[M](M-3
                   (00207) ;                                     )
```

```
A45 068BC 08980898 (00208)          MOV(R,FXO)\MOV(R,FXO)
A46 068BE 084C084A (00209)          MOV(FXI,M4)\MOV(EXI,M2)                    STORE A[M](M-3)\A[M](3)
A47 068C0 08B008B0 (00210)          MOV(P,A0)
                   (00211) *
A48 06892 84608460 (00212) X23RD    MUL(M0,M7)\MUL(M0,M7)                      A[M-1](M-1)*K[M]\A[M-1](
                   (00213) ;                                                   1)*K[M]
A49 06894 42134214 (00214)          MOV(A3),ADD(A0,A2)\MOV(A4),ADD(A0,A2)      STORE A[M](3),SUM FOR A[
                   (00215) ;                                                   M](2)\A[M](M-3),SUM A[M]
                   (00216) ;                                                   (M-2)
A4A 06896 08980898 (00217)          MOV(R,FXO)\MOV(R,FXO)
A4B 06898 084A0849 (00218)          MOV(FXI,M2)\MOV(EXI,M1)                    ATORE A[M](M-2)\A[M](2)
A4C 0689A 08B008B0 (00219)          MOV(P,A0)\MOV(P,A0)
A4D 0689C 41124113 (00220)          MOV(A2),ADD(A0,A1)\MOV(A3),ADD(A0,A1)      STORE A[M](2),SUM FOR A[
                   (00221) ;                                                   M](1)\A[M](M-2),SUM A[M]
                   (00222) ;                                                   (M-1)
                   (00223) *
A4E 0689E 85F085F0 (00224)          MUL(M3,M7)                                 K[M]^2
A4F 068A0 08980898 (00225)          MOV(R,FXO)\MOV(R,FXO)
A50 068A2 0849084B (00226)          MOV(FXI,M1)\MOV(EXI,M0)                    A[M](M-1)\A[M](1)
A51 068A4 08910892 (00227)          MOV(R,A1)\MOV(R,A2)                        A[M](1)\A[M](M-1)
A52 068A6 08F708F7 (00228)          MOV(IOA,A7)                                -A[M](M) (=P[M])
A53 068A8 0AF00AF0 (00229)          NEG(A7)                                    MAKE IT REFLN COEF
A54 068AA 08B608B6 (00230)          MOV(P,A6)                                  K[M]^2
A55 068AC 4EA80891 (00231)          MOV(M0),SUB(A5,A6)\MOV(R,A1)               K[M]=A[M](M),1-K[M]^2
A56 068AE 08D708D7 (00232)          MOV(IO,A7)                                 P[M+1]
A57 068B0 02EB02EB (00233)          MOV(M3),R(A7)                              1-K[M]^2,GET K[M+1]
A58 068B2 85A085A0 (00234)          MUL(M3,M5)                                 (1-K[M]^2)*PROD
A59 068B4 08AD08AD (00235)          MOV(P,M5)                                  NEW PROD
A5A 068B6 088B088B (00236)          MOV(R,M3)                                  K[M+1]
A5B 068B8 088F088F (00237)          MOV(R,M7)                                  K[M+1]
A5C 068BA A000A000 (00238)          RETURN
         0000005D (00239)           DEQUSSZ=*A-DEQUSSA
    068BC          (00240)          END DEQUSSZ
                   (00241)          EJECT
```

```
                            (00242) *
                            (00243) *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                            (00244) *
                            (00245)          EVEN
    068BC 00006960          (00246)          ADDR G106SI              POINTER TO CONSTRUCTED I
                            (00247) ;                                 NSTRUCTION BLOCK
    068BE 000068C4          (00248)          ADDR G106$+2*SCLRS       POINTER TO SCALAR BLOCK
    068C0 0000              (00249)          DATA 0                   NUMBER OF SCALARS
    068C1 009E              (00250)          DATA G106SZ              MODULE SIZE
    068C2 00006924          (00251)          ADDR G106SA              POINTER TO CHAIN ANCHOR
                            (00252)          EVEN                     END ON WORD BOUNDARY
                            (00253) *
                            (00254) G106$    BEGIN APS(G106)
A00 068C4 00102440          (00255) SCLRS    JSP(G106$1,P1)           SET INPUT PC(PC1)
A01 068C6 02300030          (00256)          SET(R0)                  ENABLE APS OUTPUT
A02 068C8 04442F35          (00257)          LOAD(BR0,QPRMS-1(2))     QPRM(.) BA-1
A03 068CA 06642134          (00258)          LOAD(BR2,PDECS1(2))      PDECS1(.) BA
A04 068CC 090E0001          (00259)          ADD(BR0,HS,TE,C)         IQ=P1 THEN PC=PC1
A05 068CE 0A642174          (00260)          LOAD(BR2,PDECS2(2))      PDECS2(.) BA
A06 068D0 0D0E0001          (00261)          ADD(BR0,HS,TE,C)         IQ=P2 THEN PC=PC1
A07 068D2 0E6421B4          (00262)          LOAD(BR2,PDECS3(2))      PDECS3(.) BA
A08 068D4 110E0001          (00263)          ADD(BR0,HS,TE,C)         IQ=P3 THEN PC=PC1
A09 068D6 126421D4          (00264)          LOAD(BR2,PDECS4(2))      PDECS4(.) BA
A0A 068D8 150E0001          (00265)          ADD(BR0,HS,TE,C)         IQ=P4 THEN PC=PC1
A0B 068DA 166421E4          (00266)          LOAD(BR2,PDECS5(2))      PDECS5(.) BA
A0C 068DC 190E0001          (00267)          ADD(BR0,HS,TE,C)         IQ=P5 THEN PC=PC1
A0D 068DE 1A642204          (00268)          LOAD(BR2,PDECS6(2))      PDECS6(.) BA
A0E 068E0 1D0E0001          (00269)          ADD(BR0,HS,TE,C)         IQ=P6 THEN PC=PC1
A0F 068E2 1E642214          (00270)          LOAD(BR2,PDECS7(2))      PDECS7(.) BA
A10 068E4 210E0001          (00271)          ADD(BR0,HS,TE,C)         IQ=P7 THEN PC=PC1
A11 068E6 2264221C          (00272)          LOAD(BR2,PDECS8(2))      PDECS8(.) BA
A12 068E8 250E0001          (00273)          ADD(BR0,HS,TE,C)         IQ=P8 THEN PC=PC1
A13 068EA 26642244          (00274)          LOAD(BR2,VARS(2))        VAR(.) BA-2
A14 068EC 290E0001          (00275)          ADD(BR0,HS,TE,C)         IQ=VAR THEN PC=PC1
A15 068EE 2A642224          (00276)          LOAD(BR2,DCS(2))         DC(.) BA-2
A16 068F0 2D0E0001          (00277)          ADD(BR0,HS,TE,C)         IQ=DC THEN PC=PC1
A17 068F2 2E6422BC          (00278)          LOAD(BR2,MSDEC(2))       M(.) BA
A18 068F4 310E0001          (00279)          ADD(BR0,HS,TE,C)         IQ=QTM THEN PC=PC1
A19 068F6 320A0001          (00280)          ADD(BR0,HS,NA)           NO IQ SINCE IQ=QTV
A1A 068F8 34642284          (00281)          LOAD(BR2,PGAINS(2))      P.GAIN(.) BA-2
A1B 068FA 370E0001          (00282)          ADD(BR0,HS,TE,C)         IQ=PG THEN PC=PC1
A1C 068FC 38300037          (00283)          SET(WI)                  STALL APS INPUT
                            (00284) *
A1D 068FE 3A460021          (00285) KAS      LOAD(BR0,PARCS-2(3))     PARC(.) BA-2
```

```
A1F 06900 3C500007 (00286)           LOAD(BR1,PSIZES)                 PARC(.) SIZE-1
A1F 06902 3EHA0002 (00287) PINCSI    ADD(BRO,WS,TF)                   IQ=PARC(I)
A20 06904 40191FB1 (00288)           SUBL(BR1,1),JUMPP(PINCSI)        FOR I=0,1...7
A21 06906 42C2043A (00289)           LOAD(BRO,SAS92(1),TF)            IQ=LTH2
                   (00290) *
A22 06908 44200031 (00291) DNFSI     CLEAR(RI)                        INPUT DONE!
A23 0690A 46000020 (00292)           NOP
                   (00293) *
A24 0690C 48202F40 (00294) G106S1    JSR(G106S0,P2)                   SET OUTPUT PC(P2)
A25 0690E 4A300037 (00295) TOPSP1    SET(WI)                          STALL APS INPUT
A26 06910 4C000020 (00296)           NOP                              RELEASED BY APU
A27 06912 4FF4230C (00297)           LOAD(BR3,INSTRS0(2),TF)          IQ=INSTRS0
A28 06914 50300037 (00298)           SET(WI)                          STALL APS INPUT
A29 06916 52000020 (00299)           NOP                              RELEASED BY APU
A2A 06918 54500000 (00300) INS0      LOAD(BR1,MSS)                    APU SETS MSS->LEVEL
A2B 0691A 5629002B (00301)           ADDB(BR2,BR1)                    D(QPRM(I))
A2C 0691C 58A9002B (00302)           ADDB(BR2,BR1,TF)                 IQ=D(QPRM(2I))
A2D 0691E 5A3E0000 (00303)           ADD(BR3,MSS,NA,C)                FOR PC1->PC0
A2E 06920 5C002560 (00304)           JUMP(TOPSP1)                     RESET TOP-OF-LOOP
                   (00305) *
A2F 06922 5F304640 (00306) G106S0    JSR(G106S3,P3)                   SET OUTPUT PC(PC3)
A30 06924 60400000 (00307)           LOAD(BW0,(0))                    PARC(.) BA
A31 06926 62500000 (00308)           LOAD(BW1,MSS)                    PARC(.) SIZE-1
A32 06928 64020000 (00309)           SUB(BW0,MSS)                     PARC(.) BA-1
A33 0692A 663E0000 (00310) PARCS0    ADD(BW3,MSS,NA,C)                PC3->PC
A34 0692C 68BA0002 (00311)           ADD(BW0,WS,TF)                   OQ=PARC(I)
A35 0692E 6A1133B1 (00312)           SUBL(BW1,1),JUMPP(PARCS0)        ETC FOR I=1,2...8
A36 06930 6C300029 (00313)           SET(AF1)                         SET "END-OF-PARCORS"
A37 06932 6E3E0000 (00314) VARS0     ADD(BW3,MSS,NA,C)                PC3->PC
A38 06934 70C20434 (00315)           LOAD(BW0,SAS89(1),TF)            OQ=D(QTVAR)=DTVAR
A39 06936 723E0000 (00316) DCS0      ADD(BW3,MSS,NA,C)                PC3->PC
A3A 06938 74C20432 (00317)           LOAD(BW0,SAS88(1),TF)            OQ=D(QTDC)=DTDC
A3B 0693A 763E0000 (00318) MS0       ADD(BW3,MSS,NA,C)                PC3->PC
A3C 0693C 78C2043B (00319)           LOAD(BW0,SAS91(1),TF)            OQ=D(QTM)=DTM
A3D 0693E 7A3E0000 (00320) PGS0      ADD(BW3,MSS,NA,C)                PC3->PC
A3E 06940 7CC20436 (00321)           LOAD(BW0,SAS90(1),TF)            OQ=D(QTG)=DTG
                   (00322) *
A3F 06942 7F460010 (00323)           LOAD(BW0,A1S-2(3))               A1(.) BA-2
A40 06944 80500007 (00324)           LOAD(BW1,PSIZES)                 A1(.) SIZE-1
A41 06946 82F203FA (00325)           LOAD(BW2,SAS60(1),TF)            OQ=PROD(8)=ENG
A42 06948 84BA0002 (00326) PINCSJ    ADD(BW0,WS,TF)                   OQ=A(J)
A43 0694A 861142B1 (00327)           SUBL(BW1,1),JUMPP(PINCSJ)        FOR J=0,1,...7
                   (00328) *
A44 0694C 88200030 (00329) DNFS0     CLEAR(RO)                        OUTPUT DONE!
```

```
A45 0694F 8A000020 (00330)         NOP
                   (00331) *
A46 06950 8C300032 (00332) G106$3  SET(RA)                          ENABLE APU
A47 06952 8E64230D (00333) TOPSP3  LOAD(B#2,INSTRS0+1(2),TE)        OVERWRITE INSTRS0+1
A48 06954 90200030 (00334)         CLEAR(R0)                        STALL APS OUTPUT
A49 06956 92000020 (00335)         NOP                              RELEASED BY APU
A4A 06958 94E3FFC0 (00336)         LOAD(B#2,APSSREM(1),TE)          OVERWRITE INS0
A4B 0695A 96200030 (00337)         CLEAR(R0)                        STALL APS OUTPUT
A4C 0695C 983E0000 (00338)         ADD(B#3,MSS,NA,C)                PC2->PC
A4D 0695E 9A004760 (00339)         JUMP(TOPSP3)                     RESET TOP-OF-LOOP
                   (00340) *
        00006924 (00341)           G106$A= #C                       ASSIGN VALUE TO CHAIN AN
                   (00342) ;                                        CHOR
    06960          (00343)         END #A-1
                   (00344) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    06960 00000000 (00345) G106$I  DATA 1F'0,0'
          0000009F (00346)         G106$Z=#L-G106$
    06962          (00347)         END
```

```
AIS:        00012 (00006) (00323)
AFDTSORG:   008F8 (00007) (00032)
APSSMFM:    1FFC0 (00008) (00336)
BIAS$:      0000D (00139) (00141)
CSPUSNOS:   021FC (00009) (00035)
DCS:        02224 (00091) (00276)
DCS0:       00039 (00316)
DEQUS:      06802 (00033) (00126)
DEQUSSA:    00000 (00124) (00128) (00239)
DEQUSSZ:    00050 (00125) (00239) (00240)
DNFSA:      00034 (00184)
DNFS1:      00022 (00291)
DNFS0:      00044 (00329)
G106$:      068C4 (00034) (00248) (00254) (00346)
G106$1:     00024 (00255) (00294)
G106$3:     00046 (00306) (00332)
G106$A:     06924 (00251) (00341)
G106$I:     06960 (00246) (00345)
G106$0:     0002F (00294) (00306)
G106$Z:     0009F (00250) (00346)
H$:         00001 (00011) (00259) (00261) (00263) (00265) (00267) (00269) (00271) (00273) (00275)
                  (00277) (00279) (00280) (00282)
INS0:       0002A (00116) (00300)
INCSJ:      00003 (00131) (00144)
INSTRSD:    0230C (00116) (00297) (00333)
KAS:        00010 (00285)
KTDAS:      00012 (00148)
MS:         00000 (00012)
MSS:        00000 (00013) (00300) (00303) (00308) (00309) (00310) (00314) (00316) (00318) (00320)
                  (00338)
MSDEC:      0228C (00110) (00278)
MS0:        0003B (00318)
PARCS:      00023 (00014) (00285)
PARCS0:     00033 (00310) (00312)
PDECS1:     02134 (00045) (00258)
PDECS2:     02174 (00055) (00260)
PDECS3:     02184 (00065) (00262)
PDECS4:     021D4 (00071) (00264)
PDECS5:     021F4 (00077) (00266)
PDECS6:     02204 (00081) (00268)
PDECS7:     02214 (00085) (00270)
PDECS8:     0221C (00088) (00272)
PGS0:       0003D (00320)
PGAINS:     02284 (00107) (00281)
```

```
PINCSI:    0001E (00287) (00288)
PINCSJ:    00042 (00326) (00327)
PSIZES:    00007 (00015) (00286) (00324)
QPRMS:     02E36 (00017) (00257)
SAS11:     0039B (00019)
SAS39:     003D0 (00020)
SAS60:     003EA (00021) (00325)
SAS88:     00432 (00022) (00317)
SAS89:     00434 (00023) (00315)
SAS90:     00436 (00024) (00321)
SAS91:     00438 (00025) (00319)
SAS92:     0043A (00026) (00289)
SCLRS:     00000 (00248) (00255)
START:     06800 (00027) (00118)
SVTS:      003B2 (00018) (00019) (00020) (00021) (00022) (00023) (00024) (00025) (00026)
TOPSP1:    00025 (00295) (00304)
TOPSP3:    00047 (00333) (00339)
VARS:      02244 (00097) (00274)
VARSO:     00037 (00314)
WS:        00002 (00028) (00287) (00311) (00326)
X23RD:     00048 (00162) (00163) (00212)
X4TH:      00042 (00164) (00203)
X5TH:      00043 (00165) (00202) (00204)
X6TH:      0003B (00167) (00194)
X7TH:      0003D (00168) (00193) (00196)
X8TH:      00036 (00170) (00188)
ZS:        00003 (00029)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E-    0
```

```
                    (00001) * FCB 244... "MPMWGX(Y,U,V,W)"     EXTRACT M,PG,MOVE X
                    (00002) *                                  ORIGINATED:04-OCT-79
                    (00003) *                                  UPDATED:29-MAY-80
                    (00004) * Y BID IS AUTOCORRELATIONS, USED AS BOTH OUTPUT AND INPUT.
                    (00005) * THESE ARE MOVED FROM BUFFER X1R INTO Y.
                    (00006) * U BID IS INPUT SAMPLES FROM THE A/D.  THE LAST
                    (00007) * FEW POINTS OF THIS BUFFER ARE MOVED TO THE BEGINNING OF BUFFER
                    (00008) * XOM, TO PROVIDE FRAME OVERLAP.
                    (00009) * V BID IS THE ARRAY OF PARCOR COEFFICIENTS (OUTPUT)
                    (00010) * W BID IS ARAY OF PEDICTD COEFFICIENTS(OUTPUT BUT UNUSED
                    (00011) * SUBSEQUENTLY).
                    (00012) *
                    (00013) * THIS ROUTINEFINDS THE LARGEST AUTOCORELATION IN THE RANGE O
                    (00014) * INTERESTAND STORES IT IN THE PITCH PERIOD.  IT ALSO
                    (00015) * CALCULATES THE PITCH GAIN R(PITCH)/R(0).  FINALLY, IT FINDS
                    (00016) * PARCOR COEFFICIENTS USING THE MWLD FUNCTION.
                    (00017) * DEFINE GLOBAL SYMBOLS
           000008E8 (00018)        AFDTSORG=$8E8
           000021FC (00019)        CSPUSNOS=$21FC
           00000794 (00020)        DMYS=$794
           0000001B (00021)        OOF=$1B
           00000003 (00022)        #M=3
           00000001 (00023)        HS=1
           0000005E (00024)        LIMITS=D'94'
           00000000 (00025)        MSS=0
           0000000A (00026)        NPS=D'10'
           0000000F (00027)        OFFSETS=D'15'
           0000004F (00028)        RANGES=LIMITS-OFFSETS
           000003B2 (00029)        SVTS=$03B2
           00000300 (00030)        SAS39=SVTS+2*D'39'
           000003FC (00031)        SAS61=SVTS+2*D'61'
           000003FE (00032)        SAS62=SVTS+2*D'62'
           0000042F (00033)        SAS86=SVTS+2*D'86'
           00006C80 (00034)        START=$6C80
           00000002 (00035)        WS=2
           00000003 (00036)        ZS=3
                    (00037) * DEFINE HARD BOUND BUFFERS
           00000800 (00038)        X1RS=D'2048'
           00000814 (00039)        XOMS=D'2068'
                    (00040) *
                    (00041) * EXPAND ARRAY FUNCTION DISPATCH TABLE
           00000BA0 (00042)        #L=AFDTSORG+3*2*(244-128)                  FCB 244
  00BA0 001E6CB4 (00043)        ADDR MWGXS(R7,1)
  00BA2 001F6DB4 (00044)        ADDR G110S(R7,1)
```

```
00BA4 001021FC (00045)          ADDR CSPU$NOS(,1,0)
               (00046)          EJECT
```

```
                     (00047) *
                     (00048) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                     (00049) *
            00006CB0 (00050)          #L=START
                     (00051)          EVEN
      06CB0 78000041 (00052) OFFSSET DATA 1F'15,0'
                     (00053)          EJECT
```

```
                        (00054) *
                        (00055) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00056) *
                        (00057)          EVEN
    06CB2 0000          (00058)          DATA PITCSSA                  START ADDRESS
    06CB3 0094          (00059)          DATA MWGXSSZ                  MODULE SIZE
                        (00060) MWGXS    BEGIN APU(MWGX)
          00000000      (00061)          *A=0
A00 06CB4 08FC0000      (00062) PITCSSA  MOV(IQA,OQ)\NOP               R(I)=X1R(I)
A01 06CB6 90160000      (00063)          JUMPC(PITCSSA,FWI)            FOR I=0,1,2...LPCN+1
A02 06CB8 20370000      (00064)          CLEAR(WI)\NOP                 RELEASE APS INPUT
                        (00065) *
A03 06CBA 08D31680      (00066) EXTRCTS  MOV(IQ,A3)\K(1)               OFFSET;R=1.0
A04 06CBC 000008F3      (00067)          NOP\MOV(IQA,A3)               RITE OFFSET
A05 06CBE 08F70894      (00068)          MOV(IQA,A7)\MOV(R,A4)         A7=U0;A4=1.0
A06 06C90 08160896      (00069)          MOV(ZERO,A6)\MOV(R,A6)        A6=0;A6=1 L;R LOC.
A07 06C92 16A016A0      (00070)          K(2)                          R=2.0
A08 06C94 000008F7      (00071)          NOP\MOV(IQA,A7)               A7=U1
A09 06C96 089502F5      (00072)          MOV(R,A5)\MOV(A5),R(A7)       A5=2;A5=2,R=U1
A0A 06C98 91160014      (00073)          JUMPS(MXS1,FWI)               FOR I=0,1,2...LTH-1
A0B 06C9A 08F00000      (00074) #1       MOV(IQA,A0)\NOP               A0=UE
A0C 06C9C 60F40897      (00075)          MOV(A4),MAX(A7,A0)\MOV(R,A7)  A4=LOC,R=MAX\A7=MAX
A0D 06C9E B11F0028      (00076)          CALLS(MXS4,T2)                IF NEW MAX
A0E 06CA0 000044A0      (00077)          NOP\ADD(A5,A4)                R=LOC
A0F 06CA2 91160019      (00078)          JUMPS(MXS2,FWI)               EXIT IF UBS IS ODD
A10 06CA4 089708F0      (00079)          MOV(R,A7)\MOV(IQA,A0)         A7=MAX;A0=U0
A11 06CA6 B11F0025      (00080)          CALLS(MXS3,T1)                IF NEW MAX
A12 06CA8 44A060F4      (00081)          ADD(A5,A4)\MOV(A4),MAX(A7,A0) R=LOC;A4=LOC,R=MAX
A13 06CAA 90160008      (00082)          JUMPC(#1,FWI)                 EXIT IF UBS IS EVEN
A14 06CAC 02F00000      (00083) MXS1     R(A7)\NOP                     R=MAX
A15 06CAE 08910898      (00084)          MOV(R,A1)\MOV(R,EXO)          A1=MAX;EXO=MAX
A16 06CB0 B11F0028      (00085)          CALLS(MXS4,T2)                IF NEW MAX
A17 06CB2 08520000      (00086)          MOV(EXI,A2)\NOP               A2=MAX
A18 06CB4 1000001D      (00087)          JUMP(MXS5)                    TO COMMON CLEAN-UP
A19 06CB6 000002F0      (00088) MXS2     NOP\R(A7)                     R=MAX
A1A 06CB8 08910898      (00089)          MOV(R,A1)\MOV(R,EXO)          A1=MAX;EXO=MAX
A1B 06CBA B11F0025      (00090)          CALLS(MXS3,T1)                IF NEW MAX
A1C 06CBC 08520000      (00091)          MOV(EXI,A2)\NOP               A2=MAX
A1D 06CBE 622043C0      (00092) MXS5     MAX(A1,A2)\ADD(A6,A3)         R=MAX;R=LOC(MAX)+OFFSET
A1E 06CC0 089C0000      (00093)          MOV(R,OQ)\NOP                 OQ=SA=MAX
A1F 06CC2 911F0023      (00094)          JUMPS(MXS6,T1)                IF FROM RIGHT BOARD
A20 06CC4 43C00000      (00095)          ADD(A6,A3)\NOP                R=LOC(MAX)+OFFSET
A21 06CC6 089C0000      (00096)          MOV(R,OQ)\NOP                 OQ=SB=LOC(MAX)
A22 06CC8 1000003B      (00097)          JUMP(INVSR)                   NOW FORM R'(0)
```

```
A23 06CCA 0000089C (00098) MXS6    NOP\MOV(R,OO)                          OO=SB=LOC(MAX)
A24 06CCC 10000038 (00099)         JUMP(INVSR)                            NOW FORM 1.0/R(0)
                   (00100) *
                   (00101) *  SUBROUTINES:MXS3,MXS4
A25 06CCE 02800000 (00102) MXS3    R(A4)\NOP                              R=LOC
A26 06CD0 08960000 (00103)         MOV(R,A6)\NOP                          A6=LOC
A27 06CD2 A000A000 (00104)         RETURN
A28 06CD4 00000280 (00105) MXS4    NOP\R(A4)                              R=LOC
A29 06CD6 00000896 (00106)         NOP\MOV(R,A6)                          A6=LOC
A2A 06CD8 A000A000 (00107)         RETURN
                   (00108) *
                   (00109) *  INVERSE SUBR
                   (00110) *RECIP(X) IN M1, X IN M5.  RETURNS 1/X IN P.
A2B 06CDA 84A084A0 (00111) INV:    MUL(M1,M5)
A2C 06CDC 16A016A0 (00112)         K(2)
A2D 06CDE 08800880 (00113)         MOV(P,A0)                              X/X'
A2E 06CE0 48314831 (00114)         MOV(A1),SUB(A1,A0)                     2-X/X'
A2F 06CE2 088E088E (00115)         MOV(R,M6)
A30 06CE4 84C084C0 (00116)         MUL(M1,M6)                             (2-X/X')/X'
A31 06CE6 08A908A9 (00117)         MOV(P,M1)                              (2-X/X")/X'
A32 06CE8 84848484 (00118)         MOV(A4),MUL(M1,M5)                     (2-X/X')*X/X'
A33 06CEA 08800880 (00119)         MOV(P,A0)
A34 06CEC 48204820 (00120)         SUB(A1,A0)                             2-((2-X/X')*X/X')
A35 06CEE 088E088E (00121)         MOV(R,M6)
A36 06CF0 84C084C0 (00122)         MUL(M1,M6)                             ((2-X/X')/X')*(2-((2-X/X
                   (00123) ;                                              ')*X/X'))
A37 06CF2 A000A000 (00124)         RETURN
A38 06CF4 20370000 (00125) INVSR   CLEAR(WI)\NOP                          RELEASE APS INPUT
A39 06CF6 08D00000 (00126)         MOV(IO,A0)\NOP                         R(0)
A3A 06CF8 2F000000 (00127)         RCP(A0)\NOP
A3B 06CFA 08FD0000 (00128)         MOV(IOA,M5)\NOP
A3C 06CFC 08890889 (00129)         MOV(R,M1)                              1/X'
A3D 06CFE 3000002B (00130)         CALL(INV)                              GET REAL INVERSE OF R(0)
A3E 06D00 08FD0000 (00131)         MOV(IOA,M5)\NOP                        M5=R(MAX)
A3F 06D02 08A80000 (00132)         MOV(P,M0)\NOP                          M0=1.0/R0
A40 06D04 84200000 (00133)         MUL(M0,M5)\NOP                         R(MAX)/R(0)
A41 06D06 08BC0000 (00134)         MOV(P,OO)\NOP                          OO=R'(MAX)
                   (00135) *
                   (00136) *  XOM(I)=FLOAT(NIN(NTUPS-NP+I)     I=0,1,2...NP-1
A42 06D08 08FF08FF (00137)         MOV(IOA,M7)                            M7=SA=2**15
A43 06D0A 08F20000 (00138) FLTS    MOV(IQA,A2)\NOP                        A2=UE
A44 06D0C 000008F2 (00139)         NOP\MOV(IOA,A2)                        A2=UO
A45 06D0E 32403240 (00140)         NORM(A2)                               NRM<UE,EO>
A46 06D10 08880888 (00141)         MOV(R,M0)                              M0=NRM<UE>;M0=NRM<UO>
```

```
A47 06D12 847C847C (00142)          MOV(OQ),MUL(NO,M7)              OQ=SA*NRM<UE(I-1),UO(I-1
                   (00143) ;                                        )>,SA*NRM<UE,UO>
A48 06D14 90160043 (00144)          JUMPC(FLTS,F#1)                 LOOP FOR I=0,1...NP-1
A49 06D16 08BC08BC (00145)          MOV(P,OQ)
A4A 06D18 901C004A (00146) #1       JUMPC(#1,FO)                    WAIT FOR OUTPUT TO CLEAR
A4B 06D1A 20372037 (00147)          CLEAR(WI)                       LET APS CONTINUE
                   (00148) *
                   (00149) * GO ON TO MWLD PORTION OF FUNCTION.
                   (00150)          EJECT
```

```
                          *
                          *      MWLD-APU PROGRAM
                          *
                          *
                          * WEINER LEVINSON DURBAN INVERSE
                          *
                          * MATHEMATICS
                          * SEE J. MAKHOUL,LINEAR PREDICTION REVIEW
                          * PROC. IEEE, VOL 63, PP566, APR 1975
                          *
                          * BUFFER DEFINITIONS
                          *
                          * V(K), CORRELATION COEFFICIENTS, V(K)=R(K)
                          * V(K) MUST BE COMPACT 32 BIT FLOATING POINT
                          * VSIZE NOT USED IN COMPUTATION, BUT
                          * VSIZE > USIZE FOR VALID RESULTS.
                          *
                          * U(K),A(K) COEFFICIENTS
                          * U(K),MUST BE COMPACT 32 BIT FLOATING POINT
                          * U(K)=A(K-1),IE,A(0)=1 NOT IN BUFFER
                          *
                          * Y(K), PARTIAL CORRELATIONS AND ERROR
                          * Y(K) MUST BE COMPACT 32 BIT FLOATING POINT
                          * YSIZE=2*USIZE
                          * Y(K)=P(K-1), 0<=K<USIZE
                          * Y(K+USIZE)=E(K-1), USIZE<=K<YSIZE
                          *
                          * A,STABILITY TEST PARAMETER
                          * IF /P(N)/> CONTENTS OF (A), THEN
                          * FOR J>0
                          * A(N+J)=P(N+J)=0, E(N+J)=E(N)
                          *
                          *
                          *
A4C 06D1C 08E70000 MWLDSSA MOV(IOA,A7)\NOP            A7=STABILITY TEST VALUE
A4D 06D1E 080C080C         MOV(ZERO,M4)
A4E 06D20 08CD0000         MOV(IO,M5)\NOP
A4F 06D22 08E50000         MOV(IOA,A5)\NOP            M5=A5=E(0)=R(0)
                          *
                          * MWLD-APU CALCULATION OF S(N)
                          * S(N)=P(N) + SUM[1,N-1] OF R(N-J)A(N-1,J)
                          * REGISTER CONTENTS AT START
                          * M4=P(N-1), M5=A5=E(N-1), A6=1, A7=TEST
                          *
```

```
A50 06D24 2EA02EA0 (00195) #1        RCP(A5)
A51 06D26 08F20000 (00196)          MOV(IOA,A2)\NOP             A2=R(N)
A52 06D28 08080808 (00197)          MOV(ZERO,M0)
A53 06D2A 84008400 (00198)          MUL(M0,M4)                   SETS P = 0
A54 06D2C 02490249 (00199)          MOV(M1), R(A2)              M1=RCP(F(N-1))
A55 06D2E 900A0090 (00200)          JUMPC(MWLDR4,AF2)           FIRST TIME
                   (00201) *
A56 06D30 9048005C (00202)          JUMPC(MWLDSE,AF3),SET       EVEN OR ODD N
                   (00203) *
A57 06D32 202B202B (00204)          CLEAR(AF3)
                   (00205) *
A58 06D34 08FA0000 (00206) #2       MOV(IOA,M2)\NOP             M2=A(N-1,J)
A59 06D36 08EF0000 (00207)          MOV(IOA,M6)\NOP             M6=R(N-J)
A5A 06D38 85508550 (00208)          MOV(A0), MUL(M2,M6)
A5B 06D3A 42124212 (00209)          MOV(A2), ADD(A0,A2)         S+A(N-1,J+1)R(N-J-1)
                   (00210) *
A5C 06D3C 08EB0000 (00211) MWLDSE   MOV(IOA,M3)\NOP             M3=A(N-1,J+1)
A5D 06D3E 08EF0000 (00212)          MOV(IOA,M7)\NOP             M7=R(N-J-1)
A5E 06D40 85F185F1 (00213)          MOV(A1), MUL(M3,M7)
A5F 06D42 42324232 (00214)          MOV(A2), ADD(A1,A2)         S+A(N-1,J)R(N-J)
                   (00215) *
A60 06D44 90160058 (00216)          JUMPC(#2,FW1)
                   (00217) *
A61 06D46 08B008B0 (00218)          MOV(P,A0)
A62 06D48 42124212 (00219)          MOV(A2), ADD(A0,A2)
                   (00220) *
A63 06D4A 20372037 (00221) MWLDRF   CLEAR(W1)
                   (00222) *
                   (00223) *
                   (00224) * MWLD-APU CALCULATION OF P(N)
                   (00225) * P(N)=-S(N)/F(N-1)
                   (00226) * REGISTER CONTENTS AT START
                   (00227) * M4=P(N-1), A5=M5=E(N-1), A6=1, A7=TEST
                   (00228) * M1=RCP(F(N-1)), R=S(N)
                   (00229) *
                   (00230) *
A64 06D4C 08BA0000 (00231)          MOV(R,M2)\NOP                                 S(N)
A65 06D4E 3000002B (00232)          CALL(INV)                                     GET 1.0/E(N-1)
A66 06D50 08AE08AE (00233)          MOV(P,M6)                                     1.0/E
A67 06D52 A540A540 (00234)          MULN(M2,M6)
A68 06D54 168016B0 (00235)          R(1)
A69 06D56 08960896 (00236)          MOV(R,A6)                                     FOLLOWING CODE NEEDS A6=
                   (00237) ;                                                      1
A6A 06D58 08A808A8 (00238)          MOV(P,M0)                   M0=M4=A4=P(N)
```

```
A6B 06D5A 08AC08AC (00239)          MOV(P,M4)
A6C 06D5C 08B408B4 (00240)          MOV(P,A4)
A6D 06D5E 08BC0000 (00241)          MOV(P,OO)\NOP                OO = P(N) = A(N,N)
                   (00242) *
                   (00243) *
                   (00244) *
                   (00245) * MWLD-APU CALCULATION OF A(N,J)
                   (00246) * A(N-1,J)=A(J)
                   (00247) * A(N,J)=A(J)+P(N)A(N-J)
                   (00248) * A(N,N-J)=A(N-J)+P(N)A(J)
                   (00249) * LOOP COMPUTES BOTH A(N,J) AND A(N,N-J)
                   (00250) * FOR N=2M, A(N,M) COMPUTED TWICE
                   (00251) *
                   (00252) * REGISTER CONTENTS AT START
                   (00253) * M0=M4=A4=P=P(N), M5=A5=E(N-1), A6=1, A7=TEST
                   (00254) *
                   (00255) * DATA SEQUENCE
                   (00256) * INPT, [A(N-J+1),A(N-J),A(J)] FOR [1,N/2],WI, A(N/2+1)
                   (00257) * OTPT, DUMP, DUMP [A(N,J), A(N,N-J)]
                   (00258) *
                   (00259) *
A6E 06D60 904A0092 (00260)          JUMPC(MWLDAW,AF2), SET       FIRST TIME AF2 CLEAR
                   (00261) *
A6F 06D62 08F30000 (00262)          MOV(IOA,A3)\NOP              A3=A(N-J+1)
                   (00263) *
A70 06D64 08FA0000 (00264) #3       MOV(IOA,M2)\NOP              M2=A(N-J)
A71 06D66 85118511 (00265)          MOV(A1), MUL(M2,M4)
A72 06D68 433C0000 (00266)          MOV(OO), ADD(A1,A3)\NOP      OO=A(J-1)+P(N)A(N-J+1)
                   (00267) *                                      A(N-J+1)+P(N)A(J-1)
A73 06D6A 08D20000 (00268)          MOV(IO,A2)\NOP               A2=M3=A(J)
A74 06D6C 08FB0000 (00269)          MOV(IOA,M3)\NOP
A75 06D6E 85908590 (00270)          MOV(A0), MUL(M3,M4)
A76 06D70 421C0000 (00271)          MOV(OO), ADD(A0,A2)\NOP      OO=A(N-J+1)+P(N)A(J-1)
A77 06D72 08F30000 (00272)          MOV(IOA,A3)\NOP
A78 06D74 00000000 (00273)          NOP
A79 06D76 90160070 (00274)          JUMPC(#3,FWI)
                   (00275) *
A7A 06D78 20372037 (00276) MWLDAE   CLEAR(WI)
A7B 06D7A 84118411 (00277)          MOV(A1), MUL(M0,M4)
A7C 06D7C 433C0000 (00278)          MOV(OO), ADD(A1,A3)\NOP
                   (00279) *
                   (00280) *
                   (00281) * MWLD-APU CALCULATION OF E(N)
                   (00282) * E(N)=[1-P(N)P(N)]E(N-1)
```

```
                           (00283) *
                           (00284) * REGISTER CONTENTS AT START
                           (00285) *
                           (00286) * M0=M4=A4=P(N), M5=A5=E(N-1), A6=1, A7=TEST
                           (00287) * P=P(N)P(N),R=P(N)=A(N,N)
                           (00288) * DATA SEQUENCE
                           (00289) * OTPT  P(N), E(N)
A7D 06D7E 08800880 (00290)         MOV(P,A0)                  A0=P(N)P(N)
A7E 06D80 48DC0000 (00291)         MOV(QQ), SUB(A6,A0)\NOP    QQ=A(N,N)
A7F 06D82 028A028A (00292)         MOV(M2), R(A4)             M2=1-P(N)P(N)
A80 06D84 85208520 (00293)         MUL(M2,M5)                 E(N-1)* [1-P(N)P(N)]
A81 06D86 74FC0000 (00294)         MOV(QQ), MAXABS(A7,A4)\NOP    QQ=P(N)
A82 06D88 08800880 (00295)         MOV(R,NULL)                T1 SET IF /P(N)/>TEST
A83 06D8A 086C0000 (00296)         MOV(P,QQ)\NOP              QQ=E(N)
A84 06D8C 20892089 (00297)         SETTG(AF1)                 AF1 SET IF /P(N)/>TEST
A85 06D8E 08850885 (00298)         MOV(P,A5)
A86 06D90 08AD08AD (00299)         MOV(P,M5)
A87 06D92 2048204B (00300)         SET(AF0)                   LET APS/OTPT GO
A88 06D94 911D00BF (00301)         JUMPS(MWLDD,F1)               GO BACK UNLESS DONE
                   (00302) *
A89 06D96 901E0050 (00303)         JUMPC(#1,T1)
                   (00304) *
                   (00305) *
                   (00306) * MWLD-APU ABORT ROUTINE
                   (00307) * P REGISTER=E(N)
                   (00308) *
                   (00309) *
A8A 06D98 081C0000 (00310) #4      MOV(ZERO,QQ)\NOP           A(N+J)=0
A8B 06D9A 081C0000 (00311)         MOV(ZERO,QQ)\NOP           P(N+J)=0
A8C 06D9C 088C0000 (00312)         MOV(P,QQ)\NOP              E(N+J)=E(N)
A8D 06D9E 901C008A (00313)         JUMPC(#4,F0)
                   (00314) *
A8E 06DA0 20322032 (00315) MWLDD   CLEAR(RA)
A8F 06DA2 1000004C (00316)         JUMP(MWLD$SA)
A90 06DA4 90160090 (00317) MWLDRW  JUMPC(MWLDRW,FW1)
A91 06DA6 10000063 (00318)         JUMP(MWLDRE)
A92 06DA8 08F00000 (00319) MWLDAW  MOV(IOA,NULL)\NOP
A93 06DAA 1000007A (00320)         JUMP(MWLDAE)
                   (00321) *
          00000094 (00322)         MWGX$SZ=*A-P1TC$SA
    06DAC          (00323)         END
                   (00324) *
                   (00325) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                   (00326) *
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```
                          (00327)         EVEN
     06DAC 00006FB2       (00328)         ADDR MWGXSI                    POINTER TO CONSTRUCTED I
                          (00329) ;                                      NSTRUCTION BLOCK
     06DAE 00006F20       (00330)         ADDR G110S+2*MWGXSS            POINTER TO SCALAR BLOCK
     06DB0 0000           (00331)         DATA 0                         NUMBER OF SCALARS
     06DB1 0110           (00332)         DATA MWGXSZ                    MODULE SIZE
     06DB2 00006F9C       (00333)         ADDR MWGXSA                    POINTER TO CHAIN ANCHOR
                          (00334)         EVEN                           END ON WORD BOUNDARY
                          (00335) *
                          (00336) G110S   BEGIN APS(G110)
A00  06DB4 00202440       (00337)         JSN(G110S0,P2)                 SET OUTPUT PC(P2)
A01  06DB6 02300030       (00338)         SET(RO)                        ENABLE OUTPUT ADDRESSING
A02  06DB8 04000020       (00339)         NOP
A03  06DBA 06460800       (00340)         LOAD(BR0,X1RS(3))              X1R(.) BA
A04  06DBC 08020004       (00341)         SUB(BR0,4)                     X1R(.) BA-4
A05  06DBE 0A600000       (00342)         LOAD(BR2,(0))                  DUMMY OP FOR EXEC
A06  06DC0 0C500000       (00343)         LOAD(BR1,MSS)                  R(.) SIZE-1
A07  06DC2 0E220000       (00344)         SUB(BR2,MSS)                   DUMMY OP FOR EXEC
A08  06DC4 10BA0004       (00345) #1      ADD(BR0,4,TF)                  IQ=X1R(I)
A09  06DC6 121908B1       (00346)         SUBL(BR1,1),JUMPP(#1)          FOR I=0,1,2...LPCN+1
A0A  06DC8 14300037       (00347)         SET(WI)                        STALL APS INPUT
A0B  06DCA 16000020       (00348)         NOP                            RELEASED BY APU
                          (00349) *
A0C  06DCC 18460800       (00350)         LOAD(BR0,X1RS(3))              X1R(.) BA
A0D  06DCE 1A020004       (00351)         SUB(BR0,4)                     X1R(.) BA-4
A0E  06DD0 1C390011       (00352)         MOVB(BR3,BR0)                  SAVE X1R(.) BA-4
A0F  06DD2 1E0A003C       (00353)         ADD(BR0,4*OFFSETS)             ADD OFFSET TO X1R(.) BA
A10  06DD4 2050004F       (00354)         LOAD(BR1,RANGES)               X1R(.) SEARCH RANGE
A11  06DD6 22F26C80       (00355)         LOAD(BR2,OFFSSET(1),TF)        IQ=OFFSET
A12  06DD8 24BA0004       (00356) #2      ADD(BR0,4,TF)                  IQ=X1R(I)
A13  06DDA 261912B1       (00357)         SUBL(BR1,1),JUMPP(#2)          FOR I=15,16,...,94
A14  06DDC 28300037       (00358)         SET(WI)                        STALL APS INPUT
A15  06DDE 2A000020       (00359)         NOP                            RELEASED BY APU
                          (00360) *
A16  06DE0 2CBA0004       (00361) INVS1   ADD(BR3,4,TF)                  IQ=X1R(0)
A17  06DE2 2EC203FC       (00362)         LOAD(BR0,SAS61(1),TF)          IQ=SAS61=X1R(MAX)
                          (00363) *
A18  06DE4 30C203D0       (00364) IFLTS   LOAD(BR0,SAS39(1),TF)          IQ=2**15
A19  06DE6 3240102B       (00365)         LOAD(BR0,(1))                  NIN(.) BA
A1A  06DE8 34500000       (00366)         LOAD(BR1,MSS)                  NIN(.) SIZE-1=NTUPS-1
A1B  06DEA 36220000       (00367)         SUB(BR2,MSS)                   DUMMY OP FOR EXEC
A1C  06DEC 3B09002B       (00368)         ADDB(BR0,BR1)                  NIN(.) BA+NTUPS-1
A1D  06DEE 3A02000A       (00369)         SUB(BR0,NPS)                   NIN(.) BA+NTUPS-1-NP
A1E  06DF0 3C600009       (00370)         LOAD(BR2,NPS-1)                MOVE SIZE
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A1F 06DE2 3E0A0001 (00371) IFLTST  ADD(BRO,MS,TE)                                   IQ=NIN(1)
A20 06DE4 40291EB1 (00372)         SUBL(BR2,1),JUMPP(IFLTST)                        FOR I=NTUPS-NP+1...NTUPS
                   (00373) ;                                                        -1
A21 06DE6 42300037 (00374)         SET(W1)                                          STALL
A22 06DE8 44000020 (00375)         NOP
                   (00376) *
A23 06DEA 46003660 (00377) DNEST   JUMP(MWGXSS)                                     GO DO MWLD PORTION
                   (00378) *
A24 06DEC 48300032 (00379) G110SD  SET(RA)                                          ENABLE APU
A25 06DEE 4A40001B (00380)         LOAD(BW0,[0])                                    R(.) BA
A26 06E00 4C500000 (00381)         LOAD(BW1,MSS)                                    R(.) SIZE-1
A27 06E02 4E020000 (00382)         SUB(BW0,MSS)                                     R(.) BA-2
A28 06E04 50BAB006 (00383) #1      ADD(BW0,[BI,TE)                                  OQ=R(I)
A29 06E06 521128B1 (00384)         SUBL(BW1,1),JUMPP(#1)                            FOR I=0,1,2...LPCN+1
                   (00385) *
A2A 06E08 54C203EC (00386) SCLRS   LOAD(BW0,SAS61(1),TE)                            OQ=X1R(MAX)
A2B 06E0A 56C203EE (00387)         LOAD(BW0,SAS62(1),TE)                            OQ=M
                   (00388) *
A2C 06E0C 58C203EC (00389) INVSD   LOAD(BW0,SAS61(1),TE)                            OQ=X1R'(MAX)
                   (00390) *
A2D 06E0E 5AC20794 (00391) OFLTS   LOAD(BW0,DMYS(1),TE)                             OQ=?
A2E 06E10 5CC20794 (00392)         LOAD(BW0,DMYS(1),TE)                             OQ=?
A2F 06E12 5E440814 (00393)         LOAD(BW0,XOMS(2))                                XOM(.) BA
A30 06E14 60500009 (00394)         LOAD(BW1,NPS-1)                                  XOM(.) SIZE-1
A31 06E16 62020002 (00395)         SUB(BW0,2)                                       XOM(.) BA-2
A32 06E18 648A0002 (00396) OFLTSJ  ADD(BW0,WS,TE)                                   OQ=XOM(J)
A33 06E1A 661132B1 (00397)         SUBL(BW1,1),JUMPP(OFLTSJ)                        FOR J=0,1,....NP-1
                   (00398) *
A34 06E1C 68200030 (00399) DNESD   CLEAR(RU)                                        OUTPUT DONE!
A35 06E1E 6A000020 (00400)         NOP
                   (00401) *
                   (00402) *
                   (00403) *
                   (00404) *
                   (00405) *
                   (00406) * WEINER - APS INITIALIZATION ROUTINES
                   (00407) *
A36 06E20 6CE2042F (00408) MWGXSS  LOAD(BR2,SAS86(1),L,TE)        INPUT STABILITY TEST
                   (00409) *
A37 06E22 6EC0001F (00410)         LOAD(BRO,[0],L,TE)            INPT R(0)
A38 06E24 70500000 (00411)         LOAD(BR1,MSS)                 NOT USED
A39 06E26 720A0000 (00412)         ADD(BRO,MSS)                  BRO=R(1)
A3A 06E28 74500000 (00413)         LOAD(BR1,0)
A3B 06E2A 76010013 (00414)         MOVB(BW0,BR1,                 BW0=0=2(N-1)
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A3C 06F2C 7B70300A (00415)          LOAD(BR3,[3],L)              BR3=A(1)
A3D 06F2E 7A500000 (00416)          LOAD(BR1,MSS)                BR1=ASIZE-1, NOT USED
A3E 06F30 7C320000 (00417)          SUB(BR3,MSS)                 BR3=A(0)
                   (00418) *
                   (00419) *
                   (00420) * MWLD - APS S(N) INPUT
                   (00421) * REGISTER CONTENTS AT START
                   (00422) * BRO=R(1), BWO=2(N-1), BR3=A(0)=AB-2
                   (00423) *
                   (00424) *
A3F 06F32 7EB9002B (00425) #1       ADDB(BRO,BWO,TF)             INPT R(N)
A40 06F34 80190010 (00426)          MOVB(BR1,BWO)                BR1=2(N-1)
A41 06F36 82290017 (00427)          MOVB(BR2,BR3)
A42 06F38 84194BF2 (00428)          SUBL(BR1,2),JUMPN(MWLSC)
A43 06F3A 86004560 (00429)          JUMP(MWLSF)
                   (00430) *
A44 06F3C 8EB20002 (00431) #2       SUB(BRO,2,TF)                INPT R(N-J)
                   (00432) *
A45 06F3E 8AAA0002 (00433) MWLSF    ADD(BR2,2,TF)                INPT A(J)
A46 06F40 8C1944B2 (00434)          SUBL(BR1,2), JUMPP(#2)
                   (00435) *
A47 06E42 8EB94B72 (00436)          SUBL(BPO,2,TF),JUMP(MWLSC)   INPT R(1)
                   (00437) *
A48 06E44 90300037 (00438) MWLSC    SET(WI)
A49 06E46 92000020 (00439)          NOP(0)
A4A 06F48 9401003A (00440)          ADDL(BWO,2)                  BWO=2N
                   (00441) *
                   (00442) *
                   (00443) *
                   (00444) * MWLD = APS  A(N,J)  CALCULATION INPT
                   (00445) * REGISTER CONTENTS AT START
                   (00446) * BRO=R(1), BWO=2N
                   (00447) * BR2=A(N-1), BR3=A(0)=AB-2
                   (00448) *
                   (00449) *
A4B 06E4A 962A0002 (00450)          ADD(BR2,2)                   BR2=A(N)
A4C 06E4C 98210015 (00451)          MOVB(BW2,BR2)
A4D 06F4E 9A205C40 (00452)          JSN(MWLOT,P2)                SET UP OUTPUT
                   (00453) *
A4E 06F50 9C195250 (00454)          MOVB(BR1,BWO), JUMP(MWLAE)   BR1=2N
                   (00455) *
A4F 06E52 9EAA0000 (00456) #3       ADD(BR2,0,TF)                A(N-1,N-J+1)INPT
A50 06E54 A0A20002 (00457)          SUB(BR2,2,TF)                A(N-1,N-J)INPT
A51 06F56 A2BA0002 (00458)          ADD(BR3,2,TF)                A(N-1,J)INPT
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                      (00459) *
A52 06E58 A4194EB4 (00460) MWLAF    SUBL(BR1,4), JUMPP(#3)
                      (00461) *
A53 06E5A A670302E (00462) MWLT     LOAD(BR3,[31,L)              BR3=A(1)=AB
A54 06E5C AB500000 (00463)          LOAD(BR1,MSS)                ASIZE=N,DONE
A55 06E5E AA320000 (00464)          SUB(BR3,MSS)                 BR3=A(0)=AB-2
A56 06E60 AC19002B (00465)          ADDB(BR1,BR1)                BR1=2N-2, DONE
A57 06E62 AEA95B7B (00466)          ADDL(BR2,0,TF), JUMP(#A+1)                 CLEANUP OF A(N) CALC*
A58 06E64 B0300037 (00467)          SET(WI)
A59 06E66 B2000020 (00468)          NOP(0)
A5A 06E68 B4193EA0 (00469)          SUBB(BR1,BW0), JUMPP(#1)
A5B 06E6A B62059F1 (00470)          JUMPS(#A-2,RI),CLEAR
                      (00471) *
                      (00472) *
                      (00473) * MWLD - APS OUTPUT
                      (00474) *
                      (00475) * REGISTER CONTENTS AT START
                      (00476) * BW0=2N, BW2=A(N)
                      (00477) *
                      (00478) *
A5C 06E6C B8300030 (00479) MWLOT    SET(RO)
A5D 06E6E BAB10014 (00480)          MOVB(BW3,BW2,TF)             BW3=A(N), OUTPUT
A5E 06E70 BC210020 (00481)          SUBB(BW2,BW0)                BW2=A(0)
A5F 06E72 BED20794 (00482)          LOAD(BW1,DMYS(1),TF)       OTPT DUMP
A60 06E74 C091003B (00483)          ADDL(BW1,0,TF)               OTPT DUMP
A61 06E76 C2116450 (00484)          MOVB(BW1,BW0), JUMP(MWLOE)   BW1=2N
                      (00485) *
A62 06E78 C4AA0002 (00486) #4       ADD(BW2,2,TF)                OTPT A(N,J)
A63 06E7A C6B20002 (00487)          SUB(BW3,2,TF)                OTPT A(N,N-J)
                      (00488) *
A64 06E7C C8116284 (00489) MWLOE    SUBL(BW1,4),JUMPP(#4)
A65 06E7E CA602024 (00490)          LOAD(BW2,[21,L)              BW2=P(1)=PB
A66 06E80 CC500000 (00491)          LOAD(BW1,MSS)
A67 06E82 CE220000 (00492)          SUB(BW2,MSS)                 BW2=P(0)=PB-2
A68 06E84 D01A0001 (00493)          ADD(BW1,1)                   BW1=PSIZE=2ASIZE
A69 06E86 D2A1002B (00494)          ADDB(BW2,BW0,TF)             OTPT P(N)
A6A 06E88 D4A1002A (00495)          ADDB(BW2,BW1,TF)             OTPT E(N)
                      (00496) *
A6B 06E8A D6000020 (00497) #5       NOP(0)
A6C 06E8C D8006BAB (00498)          JUMPC(#5,AF0)                WAIT ON APU
                      (00499) *
A6D 06E8E DA206E6B (00500)          JUMP(#A+1,AF0),CLEAR
A6E 06E90 DC007DA9 (00501)          JUMPC(MWLOD,AF1)             JUMP TO DONE IF NO ABORT
                      (00502) *
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A6F 06F92 DE200031 (00503)          CLEAR(R1)
A70 06F94 F0390010 (00504)          MOVB(BR3,BW0)              BR3 = 2N
A71 06F96 F2290010 (00505)          MOVB(BR2,BW0)              BR2 = 2N
A72 06F98 F4390022 (00506)          SUBB(BR3,BW1)              BR3=2N-ASIZE
A73 06F9A F6390031 (00507)          SUBL(BR3,1)                BR3=2N-ASIZE-1
                   (00508) *
A74 06F9C F840301F (00509)          LOAD(BW0,I31)              BW0 = A(1)
A75 06F9E FA700000 (00510)          LOAD(BW3,MSS)              NOT USED
A76 06FA0 FC020000 (00511)          SUB(BW0,MSS)               BW0 = A(0)
A77 06FA2 FE017C6D (00512)          ADDB(BW0,BR2),JUMP(MWLOC)  BW0 = A(N)
                   (00513) *
A78 06FA4 F0HA0002 (00514) #6       ADD(BW0,2,TF)              OTPT A(N+J)=0
A79 06FA6 F2210022 (00515)          SUBB(BW2,BW1)              BW2=P(N+J-1)
A7A 06FA8 F4AA0002 (00516)          ADD(BW2,2,TF)              OTPT P(N+J)=0
A7B 06FAA F6A1002A (00517)          ADDB(BW2,BW1,TF)           OTPT E(N+J)=E(N)
A7C 06FAC F8397BFA (00518) MWLOC    ADDL(BR3,2), JUMPN(#6)
                   (00519) *
A7D 06FAE FA200030 (00520) MWLOD    CLEAR(R0)
A7E 06FB0 FC000020 (00521)          NOP
                   (00522) *
          00006F9C (00523)          MWGXSA=#C                                              ASSIGN VALUE TO CHAIN AN
                   (00524) ;                                                               CHOR
    06FB2          (00525)          END #A-1
                   (00526) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    06FB2 00000000 (00527) MWGXST   DATA 9F'0,0'
     ...
          00000110 (00528)          MWGXSZ=#L-G110S
    06FC4          (00529)          END
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AFDTSORG:  00HFB (00018) (00042)
CSPUSNOS:  021FC (00019) (00045)
DMYS:      00794 (00020) (00391) (00392) (00482)
DNFSI:     00023 (00377)
DNFSO:     00034 (00399)
EXTRCTS:   00003 (00066)
FLTS:      00043 (00138) (00144)
G110S:     06DB4 (00044) (00330) (00336) (00528)
G110SO:    00024 (00337) (00379)
HS:        00001 (00023) (00371)
IFLTS:     0001B (00364)
IFLTSI:    0001F (00371) (00372)
INV:       0002B (00111) (00130) (00232)
INVSI:     00016 (00361)
INVSO:     0002C (00389)
INVSP:     0003B (00097) (00099) (00125)
LIMITS:    0005F (00024) (00028)
MSS:       00000 (00025) (00343) (00344) (00366) (00367) (00381) (00382) (00411) (00412) (00416)
                 (00417) (00463) (00464) (00491) (00492) (00510) (00511)
MWGXS:     06CB4 (00043) (00060)
MWGXSA:    06F9C (00333) (00523)
MWGXSI:    06FB2 (00328) (00527)
MWGXSS:    00036 (00330) (00377) (00408)
MWGXSSZ:   00094 (00059) (00322)
MWGXSZ:    00110 (00332) (00528)
MWLAF:     00052 (00454) (00460)
MWLDSSA:   0004C (00185) (00316)
MWLDAF:    0007A (00276) (00320)
MWLDAW:    00092 (00260) (00319)
MWLDD:     0008F (00301) (00315)
MWLDRF:    00063 (00221) (00318)
MWLDRW:    00090 (00200) (00317) (00317)
MWLDSF:    0005C (00202) (00211)
MWLOC:     0007C (00512) (00518)
MWLOD:     0007D (00501) (00520)
MWLOF:     00064 (00484) (00489)
MWLOT:     0005C (00452) (00479)
MWLSC:     00048 (00428) (00436) (00438)
MWLSF:     00045 (00429) (00433)
MWLT:      00053 (00462)
MXS1:      00014 (00073) (00083)
MXS2:      00019 (00078) (00088)
MXS3:      00025 (00080) (00090) (00102)
MXS4:      00028 (00076) (00085) (00105)
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MXS5:       0001D (00087) (00092)
MXS6:       00023 (00094) (00098)
NPS:        0000A (00026) (00369) (00370) (00394)
OFFSSET:    06C80 (00052) (00355)
OFFSETS:    0000F (00027) (00028) (00353)
OFLTS:      0002D (00391)
OFLTSJ:     00032 (00396) (00397)
OOF:        0001F (00021)
PITCSSA:    00000 (00058) (00062) (00063) (00322)
RANGES:     0004F (00028) (00354)
SAS39:      00300 (00030) (00364)
SAS61:      003FC (00031) (00362) (00386) (00389)
SAS62:      003FE (00032) (00387)
SAS86:      0042F (00033) (00408)
SCLRS:      0002A (00386)
START:      06C80 (00034) (00050)
SVTS:       00382 (00029) (00030) (00031) (00032) (00033)
WS:         00002 (00035) (00396)
X1RS:       00800 (00038) (00340) (00350)
XOMS:       00814 (00039) (00393)
ZS:         00003 (00036)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   F=   0
```

```
                   (00001) *  FCB 245... "MPESTV(U)"  CREATE PITCH & VOCAL TRACT RESPONSE
                   (00002) *                                 ORIGINATED:01-OCT-79
                   (00003) *                                 UPDATED:09-JUL-80
                   (00004) *  DEFINE GLOBAL SYMBOLS
                   (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1F
                   (00006)         OPADD DOF, (3 .LS. 10) + (12 .LS. 5) + $1B
          000008E8 (00007)         AFDT$ORG=$8E8
          0001FFC0 (00008)         APS$MEM=$1FFC0
          00000007 (00009)         ASIZE$=D'8'-D'1'
          000021FC (00010)         CSPU$NOS=$21FC
          00000794 (00011)         DMY$=$794
          00000003 (00012)         #M=3
          00000001 (00013)         H$=1
          000000FF (00014)         LTHM1$=D'256'-D'1'
          00000000 (00015)         M$=0
          00000000 (00016)         M$$=0
          00000382 (00017)         SVT$=$0382
          000003CE (00018)         SA$38=SVT$+2*D'38'
          0000043A (00019)         SA$92=SVT$+2*D'92'
          00000436 (00020)         SA$90=SVT$+2*D'90'
          00000438 (00021)         SA$91=SVT$+2*D'91'
          00000444 (00022)         SA$97=SVT$+2*D'97'
          00000414 (00023)         SA$73=SVT$+2*D'73'
          000001FF (00024)         SIZE$=D'512'-D'1'
          00006B70 (00025)         START=$6B70
          00000002 (00026)         W$=2
          00000004 (00027)         WW$=4
          00000800 (00028)         X1$=D'2048'
          00000800 (00029)         X1P$=X1$
                   (00030) *
                   (00031) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
          00000BA6 (00032)         #L=AFDT$ORG+3*2*(245-128)                  FCB 245
     0BA6 001F6B72 (00033)         ADDR VOCO$(R7,1)
     0BA8 001F6C02 (00034)         ADDR G107$(R7,1)
     0BAA 001021FC (00035)         ADDR CSPU$NOS(,1,0)
                   (00036)         EJECT
```

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          (00037) *
          (00038) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
          (00039) *
00006B70  (00040)          *L=START
          (00041)          EVEN
          (00042)          EJECT
```

```
                        (00043) *
                        (00044) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00045) *
                        (00046)           EVEN
    06B70 0000          (00047)           DATA VOCOSSA                                      START ADDRESS
    06B71 0044          (00048)           DATA VOCOSSZ                                      MODULE SIZE
                        (00049) VOCOS     BEGIN APU(VOCO)
          00000000      (00050)           $A=0
A00 06B72 16801680      (00051) VOCOSSA   K(1)
A01 06B74 08F608F0      (00052)           MOV(IOA,A6)\MOV(IOA,A0)                           512=N
A02 06B76 08F008F3      (00053)           MOV(IOA,A0)\MOV(IOA,A3)                           M=PITCH PERIOD
A03 06B78 08910892      (00054)           MOV(R,A1)\MOV(R,A2)                               1.0
A04 06B7A 22944800      (00055)           MOV(A4),INCRE(A4)\SUB(A0,A3)                      1;16\N-M
A05 06B7C 08C80000      (00056)           MOV(IO,M0)\NOP                                    G
A06 06B7E 08CC0000      (00057)           MOV(IQ,M4)\NOP                                    G**P,P=1
A07 06B80 49940250      (00058)           MOV(A4),SUB(A4,A1)\MOV(A0),R(A2)                  16;15\N-M;1
A08 06B82 08D50000      (00059)           MOV(IO,A5)\NOP                                    GSUM=G**1
A09 06B84 08FC4A7C      (00060)           MOV(IOA,OO)\MOV(OO),SUB(A3,A2)                    G\1.0;M-1
A0A 06B86 000008F5      (00061)           NOP\MOV(IOA,A5)                                   A1
A0B 06B88 49940AB3      (00062)           MOV(A4),SUB(A4,A1)\MOV(A3),NEG(A5)                15;14\M-1;-A1
A0C 06B8A 081C08F6      (00063)           MOV(ZERO,OO)\MOV(IOA,A6)                          Z1 OUT\A2
A0D 06B8C 08980ADC      (00064)           MOV(R,EXO)\MOV(OO),NEG(A6)                        14\-A1 OUT;-A2
A0E 06B8E 089408F5      (00065)           MOV(R,A4)\MOV(IOA,A5)                             14\A3
A0F 06B90 081C0851      (00066)           MOV(ZERO,OO)\MOV(EXT,A1)                          Z2 OUT\14
A10 06B92 4C000ABC      (00067)           SUB(A0,A4)\MOV(OO),NEG(A5)                        M-15\-A2 OUT;-A3
A11 06B94 081C08F6      (00068)           MOV(ZERO,OO)\MOV(IOA,A6)                          Z3 OUT\A4
A12 06B96 08900ADC      (00069)           MOV(R,A0)\MOV(OO),NEG(A6)                         M-14\-A3 OUT;-A4
A13 06B98 911E0042      (00070)           JUMPS(NOGD,T1)                                    FOR DEBUGGING
A14 06B9A 840008F5      (00071)           MUL(M0,M4)\MOV(IOA,A5)                            G**2 FOR NEXT ITER\A5
A15 06B9C 081C0ABC      (00072)           MOV(ZERO,OO)\MOV(OO),NEG(A5)                      Z4 OUT\-A4 OUT,-A5
A16 06B9E 081C08F6      (00073)           MOV(ZERO,OO)\MOV(IOA,A6)                          Z5 OUT\A6
A17 06BA0 08920ADC      (00074)           MOV(R,A2)\MOV(OO),NEG(A6)                         M-15=M'\-A5 OUT;-A6
A18 06BA2 081C08F5      (00075)           MOV(ZERO,OO)\MOV(IOA,A5)                          Z6 OUT\A7
A19 06BA4 00000ABC      (00076)           NOP\MOV(OO),NEG(A5)                               -A6 OUT;-A7
A1A 06BA6 081C08F6      (00077)           MOV(ZERO,OO)\MOV(IOA,A6)                          Z7 OUT\A8
A1B 06BA8 00000ADC      (00078)           NOP\MOV(OO),NEG(A6)                               -A7 OUT;-A8
A1C 06BAA 081C0000      (00079)           MOV(ZERO,OO)\NOP                                  Z8 OUT
A1D 06BAC 4900491C      (00080)           SUB(A0,A1)\MOV(OO),SUB(A0,A1)                     M'-1\-A8 OUT;N-M-14
A1E 06BAE 1000002A      (00081)           JUMP(COMM)
A1F 06BB0 08950000      (00082) #1        MOV(R,A5)\NOP                                     UPDATE SUMG
A20 06BB2 081C081C      (00083)           MOV(ZERO,OO)                                      Z1 OUT
A21 06BB4 081C081C      (00084)           MOV(ZERO,OO)                                      Z2 OUT
A22 06BB6 081C081C      (00085)           MOV(ZERO,OO)                                      Z3 OUT
A23 06BB8 84000000      (00086)           MUL(M0,M4)\NOP                                    G**(P+1)
```

```
A24 06BBA 081C081C (00087)          MOV(ZERO,00)                               Z4 OUT
A25 06BBC 081C081C (00088)          MOV(ZERO,00)                               Z5 OUT
A26 06BBE 081C081C (00089)          MOV(ZERO,00)                               Z6 OUT
A27 06BC0 081C081C (00090)          MOV(ZERO,00)                               Z7 OUT
A28 06BC2 49004900 (00091)          SUB(A0,A1)                                 M'-1 FOR LATER TEST\N'-1
                   (00092) ;                                                   4
A29 06BC4 081C081C (00093)          MOV(ZERO,00)                               Z8 OUT
A2A 06BC6 081C081C (00094) COMM     MOV(ZERO,00)                               Z9 OUT
A2B 06BC8 081C081C (00095)          MOV(ZERO,00)                               Z10 OUT
A2C 06BCA 08AC0000 (00096)          MOV(P,M4)\NOP                              G**P
A2D 06BCC 081C081C (00097)          MOV(ZERO,00)                               Z11 OUT
A2E 06BCE 081C081C (00098)          MOV(ZERO,00)                               Z12 OUT
A2F 06BD0 081C081C (00099)          MOV(ZERO,00)                               Z13 OUT
A30 06BD2 08B60000 (00100)          MOV(P,A6)\NOP                              G**P, TO ADD TO SUMG
A31 06BD4 081C081C (00101) *2       MOV(ZERO,00)                               Z14+ OUT
A32 06BD6 49104A10 (00102)          MOV(A0),SUB(A0,A1)\MOV(A0),SUB(A0,A2)      M'-1-L;M'-1-L-1\N'-14-L;
                   (00103) ;                                                   N'-15-L
A33 06BD8 901F0031 (00104)          JUMPC(*2,T1)                               LOOP TIL M'-1-L .LE. 0
                   (00105) *MUST BE TIME FOR PULSE
A34 06BDA 02400890 (00106)          R(A2)\MOV(R,A0)                            RESTORE M'\COUNT PULSE A
                   (00107) ;                                                   S OUTPUT
A35 06BDC 088C081C (00108)          MOV(P,00)\MOV(ZERO,00)                     PUT OUT PULSE
A36 06BDE 46B00000 (00109)          MOV(A0),ADD(A5,A6)\NOP                     M';ADD PULSE TO SUMG
A37 06BE0 901F001F (00110)          JUMPC(*1,T2)                               LOOP IF WE NEED MORE PUL
                   (00111) ;                                                   SES
A38 06BE2 08954060 (00112)          MOV(R,A5)\ADD(A3,A0)                       SUMG\N'+M-1 IS .LT. M, *
A39 06BE4 081C081C (00113) *3       MOV(ZERO,00)
A3A 06BE6 00004A10 (00114)          NOP\MOV(A0),SUB(A0,A2)                     SAVE COUNT;DECREMENT
A3B 06BE8 901F0039 (00115)          JUMPC(*3,T2)                               LOOP UNTIL WE HAVE ENOUG
                   (00116) ;                                                   H ZEROS
A3C 06BEA 089C0000 (00117)          MOV(R,00)\NOP                              SUMG OUT
A3D 06BEC 20322032 (00118)          CLEAR(RA)
A3E 06BEE 00000000 (00119)          NOP
A3F 06BF0 00000000 (00120)          NOP
A40 06BF2 00000000 (00121)          NOP
A41 06BF4 00000000 (00122)          NOP
A42 06BF6 10000042 (00123) NOGD     JUMP(NOGD)
A43 06BF8 00000000 (00124)          NOP
          00000044 (00125)          VOCOSSZ=*A-VOCOSSA
    06BFA          (00126)          END VOCOSSZ
                   (00127)          EJECT
```

```
                         (00128) *
                         (00129) *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                         (00130) *
                         (00131)          EVEN
     06BFA 00006C34      (00132)          ADDR G107SI                 POINTER TO CONSTRUCTED I
                         (00133) ;                                    NSTRUCTION BLOCK
     06BFC 00006C04      (00134)          ADDR G107S+2*SCLRS          POINTER TO SCALAR BLOCK
     06BFE 0000          (00135)          DATA 0                      NUMBER OF SCALARS
     06BFF 0034          (00136)          DATA G107SZ                 MODULE SIZE
     06C00 00006C0C      (00137)          ADDR G107SA                 POINTER TO CHAIN ANCHOR
                         (00138)          EVEN                        END ON WORD BOUNDARY
                         (00139) *
                         (00140) G107S    BEGIN APS(G107)
A00  06C02 00200040      (00141)          JSN(G107SO,P2)              SET OUTPUT PC(P2)
A01  06C04 02300030      (00142) SCLRS    SET(RO)                     ENABLE OUTPUT ADDRESSING
A02  06C06 04C2043A      (00143)          LOAD(BRO,SAS92(1),TF)       512
A03  06C08 06C20438      (00144)          LOAD(BRO,SAS91(1),TF)       M
A04  06C0A 08C20436      (00145)          LOAD(BRO,SAS90(1),TF)       G
A05  06C0C 0AC01000      (00146)          LOAD(BRO,(1),TF)            A1
A06  06C0E 0C500000      (00147)          LOAD(BR1,MSS)               DUMMY
A07  06C10 0E500000      (00148)          LOAD(BR1,MSS)               DUMMY
A08  06C12 10500006      (00149)          LOAD(BR1,6)                 COUNT A'S, NEED 8 ALL TO
                         (00150) ;                                    LD
A09  06C14 128A0002      (00151) #1       ADD(BRO,2,TF)               A(N)
A0A  06C16 141909B1      (00152)          SUBL(BR1,1),JUMPP(#1)
A0B  06C18 16200031      (00153)          CLEAR(RI)
A0C  06C1A 18000020      (00154)          NOP
                         (00155) *
A0D  06C1C 1A300032      (00156) G107S0   SET(RA)                     ENABLE APU
A0E  06C1E 1CC60802      (00157)          LOAD(BW0,X1S+2(3),TF)       X1(.) BA+2 (=X1I(0))
A0F  06C20 1E5001FE      (00158)          LOAD(BW1,SIZES-1)           X1(.) SIZE-2
A10  06C22 20820002      (00159)          SUB(BW0,2,TF)               X1R(0)
A11  06C24 228A0006      (00160) #1       ADD(BW0,6,TF)               X1I(N)
A12  06C26 24820002      (00161)          SUB(BW0,2,TF)               X1R(N)
A13  06C28 261111B1      (00162)          SUBL(BW1,1),JUMPP(#1)
                         (00163) *  LOOP  FOR N=1,2,...,255
A14  06C2A 28C20794      (00164)          LOAD(BW0,DMYS(1),TF)        TWO DUMMIES OUT
A15  06C2C 2AC20794      (00165)          LOAD(BW0,DMYS(1),TF)
A16  06C2E 2CC20414      (00166)          LOAD(BW0,SAS73(1),TF)       GSUM = ENERGY OUT
A17  06C30 2E200030      (00167)          CLEAR(RO)
A18  06C32 30000020      (00168)          NOP
                         (00169) *
           00006C0C      (00170)          G107SA= *C                  ASSIGN VALUE TO CHAIN AN
                         (00171) ;                                    CHOR
```

```
06C34          (00172)         END #A-1
               (00173) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
06C34 00000000 (00174) G107$I  DATA 1F'0.0'
      00000034 (00175)         G107$Z=#L-G107$
06C36          (00176)         END
```

```
  AFDTSURG:  00HE8 (00007) (00032)
  APSSMEM:   1FFC0 (00008)
  ASIZES:    00007 (00009)
  COMM:      0002A (00081) (00094)
  CSPUSNOS:  021FC (00010) (00035)
  DMYS:      00794 (00011) (00164) (00165)
  G107S:     06C02 (00034) (00134) (00140) (00175)
  G107SA:    06C0C (00137) (00170)
  G107S1:    06C34 (00132) (00174)
  G107S0:    0000D (00141) (00156)
  G107SZ:    00034 (00136) (00175)
  HS:        00001 (00013)
  LTHMIS:    000FF (00014)
  MS:        00000 (00015)
  MSS:       00000 (00016) (00147) (00148)
  NOGD:      00042 (00070) (00123) (00123)
  SAS3R:     003CF (00018)
  SAS73:     00414 (00023) (00166)
  SAS90:     00436 (00020) (00145)
  SAS91:     00439 (00021) (00144)
  SAS92:     0043A (00019) (00143)
  SAS97:     00444 (00022)
  SCLRS:     00001 (00134) (00142)
  SIZES:     001FF (00024) (00158)
  START:     06070 (00025) (00040)
  SVTS:      00382 (00017) (00018) (00019) (00020) (00021) (00022) (00023)
  VOCUS:     06872 (00033) (00049)
  VOCOSSA:   00000 (00047) (00051) (00125)
  VOCUSSZ:   00044 (00048) (00125) (00126)
  WS:        00002 (00026)
  WWS:       00004 (00027)
  X1S:       00800 (00028) (00029) (00157)
  X1RS:      00800 (00029)

LINES WITH ERRORS:     0  (MAP VERSION 800101.10)    E=     0
```

```
                  (00001) '  FCB 247... "MPSSRT(Y)"  SORT DCT1(,) COEFFICIENTS
                  (00002) *                                ORIGINATED:13-DEC-79
                  (00003) *                                UPDATED:30-MAY-80
                  (00004) *  DEFINE GLOBAL SYMBOLS
                  (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                  (00006)         OPADD DOE, (3 .LS. 10) + (12 .LS. 5) + $1B
                  (00007)         OPADD WAENE, (1 .LS. 10) + (12 .LS. 5) + $1A
         00000BE8 (00008)         AFDTSORG=$BE8
         0001FFC0 (00009)         A2SSMEM=$1FFC0
         000021FC (00010)         CSPUSNOS=$21FC
         00000928 (00011)         DCTS=D'2344'
         00000200 (00012)         DCT1S=D'512'
         00000400 (00013)         DCT2S=D'1024'
         00000794 (00014)         DMYS=$794
         00000003 (00015)         #M=3
         00000001 (00016)         HS=1
         00000100 (00017)         INCRES=D'256'
         00001F24 (00018)         INTGRS=$1F24
         00000000 (00019)         IORDRS=D'0'
         00000502 (00020)         ISVTS=$502
         00000502 (00021)         ISAS00=ISVTS+D'0'
         00000503 (00022)         ISAS01=ISVTS+D'1'
         00000000 (00023)         MSS=0
         0000000A (00024)         OVRSLAP=D'10'
         000000FF (00025)         SIZES=D'256'-D'1'
         000003B2 (00026)         SVTS=$03B2
         00008300 (00027)         START=$8300
         00000C00 (00028)         TABLS0=D'3072'
         00000D00 (00029)         TABLS1=TABLS0+INCRES
         00000E00 (00030)         TABLS2=TABLS1+INCRES
         00000F00 (00031)         TABLS3=TABLS2+INCRES
         00000A00 (00032)         TMP2S=D'2560'
         00000C00 (00033)         TMP4S=D'3072'
         00000002 (00034)         WS=2
         00000003 (00035)         ZS=3
                  (00036) *
                  (00037) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
         00000BB2 (00038)         #L=AFDTSORG+3*2*(247-128)                     FCB 247
    0BB2 001F8308 (00039)         ADDR SORTS(R7,1)
    0BB4 001F8422 (00040)         ADDR G106S(R7,1)
    0BB6 001021FC (00041)         ADDR CSPUSNOS(,1,0)
                  (00042)         EJECT
```

```
                    (00043) *
                    (00044) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00045) *
                    (00046)          BUS 2
          00001E14  (00047)          *L=D'7700'
                    (00048)          EVEN
01E14 3C50          (00049) INSTRS0 DATA INS0*D'512'+X'50',X'0000'
01E15 0000
01E16 3450          (00050) INSTRS1 DATA INS1*D'512'+X'50',X'0000'
01E17 0000
01E18 2C50          (00051) INSTRS2 DATA INS2*D'512'+X'50',X'0000'
01E19 0000
01E1A 2450          (00052) INSTRS3 DATA INS3*D'512'+X'50',X'0000'
01E1B 0000
01E1C 662E          (00053) INSTRS4 DATA INDS4*D'512'+X'2E',X'0000'
01E1D 0000
01E1E 6A2E          (00054) INSTRS5 DATA INDS5*D'512'+X'2E',X'0000'
01E1F 0000
01E20 562E          (00055) INSTRS6 DATA INDS6*D'512'+X'2E',X'0000'
01E21 0000
01E22 5A2E          (00056) INSTRS7 DATA INDS7*D'512'+X'2E',X'0000'
01E23 0000
                    (00057)          BUS 1
          00008300  (00058)          *L=START
                    (00059) ;T1$        DATA 1F'0.713'
                    (00060) ;T2$        DATA 1F'2.5'
                    (00061) ;T3$        DATA 1F'7.5'
08300 BF77A2C0      (00062) T1$      DATA 1F'-0.48802602'
08302 0A934F41      (00063) T2$      DATA 1F'1.32192810'
08304 17414FC1      (00064) T3$      DATA 1F'2.9068906'
                    (00065)          EJECT
```

```
                         (00066) *
                         (00067) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                         (00068) *
                         (00069)          EVEN
    08306 0000           (00070)          DATA SORTSSA                            START ADDRESS
    08307 0089           (00071)          DATA SORTSSZ                            MODULE SIZE
                         (00072) SORTS    BEGIN APU(SORT)
          00000000       (00073)          #A=0
A00 08308 08F10000       (00074) SORTSSA  MOV(IOA,A1)\NOP                         A1=THRSH1
A01 0830A 20250000       (00075)          CLEAR(G1)\NOP                           RESET STALL FLAG
A02 0830C 000008F5       (00076)          NOP\MOV(IOA,A5)                         A5=THRSH2
A03 0830E 20500000       (00077)          SET(RO)\NOP                             ENABLE OUTPUT ADDRESSING
A04 08310 08F30000       (00078)          MOV(IOA,A3)\NOP                         A3=THRSH3
A05 08312 000008F7       (00079)          NOP\MOV(IOA,A7)                         A7=1
A06 08314 00000810       (00080)          NOP\MOV(ZERO,A0)                        A0=0
A07 08316 00000811       (00081)          NOP\MOV(ZERO,A1)                        A1=0
A08 08318 00000812       (00082)          NOP\MOV(ZERO,A2)                        A2=0
A09 0831A 00000813       (00083)          NOP\MOV(ZERO,A3)                        A3=0
A0A 0831C 08F008F4       (00084)          MOV(IOA,A0)\MOV(IOA,A4)                 A0=D=DCT1(I);A4=D
A0B 0831E 49004D80       (00085)          SUB(A0,A1)\SUB(A4,A5)                   D-THRSH1;D-THRSH2
A0C 08320 08800880       (00086) INCS1    MOV(R,NULL)                             FORCE END
A0D 08322 911E0030       (00087)          JUMPS(LVLS0,T1)                         IF T1=1,LEVEL 0
A0E 08324 911F0026       (00088)          JUMPS(LVLS1,T2)                         IF T2=1,LEVEL 1
A0F 08326 46000000       (00089)          SUB(A0,A3)\NOP                          D-THRSH3
A10 08328 08800000       (00090)          MOV(R,NULL)\NOP                         FORCE END
A11 0832A 911F001C       (00091)          JUMPS(LVLS2,T1)                         IF T1=1,LEVEL 2
A12 0832C 204B0000       (00092) LVLS3    SET(AF3)\NOP                            INFORM APS OF LVL3
A13 0832E 20530000       (00093)          SET(UN)\NOP                             FIXED POINT ADD
A14 08330 00004760       (00094)          NOP\ADD(A3,A7)                          LVL3 CNT+1
A15 08332 08F008F4       (00095)          MOV(IOA,A0)\MOV(IOA,A4)                 A0=D=DCT1(I+1);A4=D
A16 08334 08FC0893       (00096)          MOV(IOA,OO)\MOV(R,A3)                   OO=I;LVL3=LVL3+1
A17 08336 20330000       (00097)          CLEAR(UN)\NOP                           RESUME FLOATING POINT!
A18 08338 49004D80       (00098)          SUB(A0,A1)\SUB(A4,A5)                   D-THRSH1;D-THRSH2
A19 0833A 910B0019       (00099) #1       JUMPS(#1,AF3)
A1A 0833C 9016000C       (00100)          JUMPC(INCS1,FWI)                        FOR I=0,1,2...LTH-1
A1B 0833E 1045003A       (00101)          JUMP(CNTSOUT,G1),SET                    GET LEVEL COUNTS
A1C 08340 204A0000       (00102) LVLS2    SET(AF2)\NOP                            INFORM APS OF LVL2
A1D 08342 20530000       (00103)          SET(UN)\NOP                             FIXED POINT ADD
A1E 08344 00004740       (00104)          NOP\ADD(A2,A7)                          LVL2 CNT+1
A1F 08346 08F008F4       (00105)          MOV(IOA,A0)\MOV(IOA,A4)                 A0=D=DCT1(I+1);A4=D
A20 08348 08FC0892       (00106)          MOV(IOA,OO)\MOV(R,A2)                   OO=I;LVL2=LVL2+1
A21 0834A 20330000       (00107)          CLEAR(UN)\NOP                           RESUME FLOATING POINT!
A22 0834C 49004D80       (00108)          SUB(A0,A1)\SUB(A4,A5)                   D-THRSH1;D-THRSH2
A23 0834E 910A0023       (00109) #1       JUMPS(#1,AF2)
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A24 0B350 9016000C (00110)          JUMPC(INCSI,FWI)            FOR I=0,1,2...LTH-1
A25 0B352 1045003A (00111)          JUMP(CNTSOUT,GI),SET        GET LEVEL COUNTS
A26 0B354 20490000 (00112) LVLS1    SET(AFI)\NOP                INFORM APS OF LVL1
A27 0B356 20530000 (00113)          SET(UN)\NOP                 FIXED POINT ADD
A28 0B358 00004720 (00114)          NOP\ADD(A1,A7)              LVL1 CNT+1
A29 0B35A 0BF00BF4 (00115)          MOV(IQA,A0)\MOV(IQA,A4)     A0=D=DCT1(I+1);A4=D
A2A 0B35C 0BFC0B91 (00116)          MOV(IQA,OO)\MOV(R,A1)       OO=I;LVL1=LVL1+1
A2B 0B35E 20330000 (00117)          CLEAR(UN)\NOP               RESUME FLOATING POINT!
A2C 0B360 490040B0 (00118)          SUB(A0,A1)\SUB(A4,A5)       D-THRSH1;D-THRSH2
A2D 0B362 9109002D (00119) #1       JUMPS(#1,AFI)
A2E 0B364 9016000C (00120)          JUMPC(INCSI,FWI)            FOR I=0,1,2...LTH-1
A2F 0B366 1045003A (00121)          JUMP(CNTSOUT,GI),SET        GET LEVEL COUNTS
A30 0B368 20480000 (00122) LVLS0    SET(AFO)\NOP                INFORM APS OF LVL0
A31 0B36A 20530000 (00123)          SET(UN)\NOP                 FIXED POINT ADD
A32 0B36C 00004700 (00124)          NOP\ADD(A0,A7)              LVL0 CNT+1
A33 0B36E 0BF00BF4 (00125)          MOV(IQA,A0)\MOV(IQA,A4)     A0=D=DCT1(I+1);A4=D
A34 0B370 0BFC0B90 (00126)          MOV(IQA,OO)\MOV(R,A0)       OO=I;LVL0=LVL0+1
A35 0B372 20330000 (00127)          CLEAR(UN)\NOP               RESUME FLOATING POINT!
A36 0B374 490040B0 (00128)          SUB(A0,A1)\SUB(A4,A5)       D-THRSH1;D-THRSH2
A37 0B376 91080037 (00129) #1       JUMPS(#1,AFO)
A38 0B378 9016000C (00130)          JUMPC(INCSI,FWI)            FOR I=0,1,2...LTH-1
A39 0B37A 20450000 (00131)          SET(GI)\NOP                 GET LEVEL COUNTS
A3A 0B37C 00000200 (00132) CNTSOUT  NOP\R(A0)                   R=LVL0 CNT
A3B 0B37E 0000023C (00133)          NOP\MOV(OO),R(A1)           R=LVL1 CNT
A3C 0B380 0000025C (00134)          NOP\MOV(OO),R(A2)           R=LVL2 CNT
A3D 0B382 0000027C (00135)          NOP\MOV(OO),R(A3)           R=LVL3 CNT
A3E 0B384 0000089C (00136)          NOP\MOV(R,OO)               OO=LVL3 CNT(0 UPTO LTH)
A3F 0B386 0B1C0B1C (00137)          MOV(ZERO,OO)                OO=0 FOR INSTR$4+1...
A40 0B388 0B1C0B1C (00138)          MOV(ZERO,OO)                THRU INSTR$7+1
A41 0B38A 00000000 (00139) #1       NOP                         WAIT FOR...
A42 0B38C 901C0041 (00140)          JUMPC(#1,FO)                "LEVELS" TO SETTLE
A43 0B38E 20370000 (00141)          CLEAR(WI)\NOP               RELEASE APS INPUT
A44 0B390 20500000 (00142)          SET(RO)\NOP                 RELEASE APS OUTPUT
A45 0B392 0BFC0000 (00143)          MOV(IQA,OO)\NOP             SCATTER-WRITE INTO INS0
A46 0B394 0BFC0000 (00144)          MOV(IQA,OO)\NOP             SCATTER-WRITE INTO INS1
A47 0B396 0BFC0000 (00145)          MOV(IQA,OO)\NOP             SCATTER-WRITE INTO INS2
A48 0B398 0BFC0000 (00146)          MOV(IQA,OO)\NOP             SCATTER-WRITE INTO INS3
A49 0B39A 00000000 (00147) #2       NOP                         WAIT FOR...
A4A 0B39C 901C0049 (00148)          JUMPC(#2,FO)                "WRITES" TO SETTLE
A4B 0B39E 20370000 (00149)          CLEAR(WI)\NOP               RELEASE APS INPUT
A4C 0B3A0 20500000 (00150)          SET(RO)\NOP                 RELEASE APS OUTPUT
A4D 0B3A2 0BFC0000 (00151) ORDRS1   MOV(IQA,OO)\NOP             OO=IORDR(I)
A4E 0B3A4 0BFC0000 (00152)          MOV(IQA,OO)\NOP             OO=IORDR(I+1)
A4F 0B3A6 0BFC0000 (00153)          MOV(IQA,OO)\NOP             OO=IORDR(I+2)
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A50 083A8 08FC0000 (00154)         MOV(IOA,00)\NOP        00=IORDR(I+3)
A51 083AA 9016004D (00155)         JUMPC(ORDRS1,FWI)      FOR I=0,1,2...LTH-1
A52 083AC 20280000 (00156)         CLEAR(AFO)\NOP         CLEAR "SKIP" FLG
A53 083AE 081C081C (00157)         MOV(ZERO,00)           00=BUFFER ZONE=0
A54 083B0 081C081C (00158)         MOV(ZERO,00)           00=BUFFER ZONE=0
A55 083B2 081C081C (00159)         MOV(ZERO,00)           00=BUFFER ZONE=0
A56 083B4 081C081C (00160)         MOV(ZERO,00)           00=BUFFER ZONE=0
A57 083B6 081C081C (00161)         MOV(ZERO,00)           00=BUFFER ZONE=0
                   (00162) *
A58 083B8 20370000 (00163) SHUFLSV CLEAR(WI)\NOP          RELEASE APS INPUT
A59 083BA 20530000 (00164)         SET(ON)\NOP            FIXED POINT ADD
A5A 083BC 08F00000 (00165)         MOV(IOA,A0)\NOP        A0=J
A5B 083BE 000008F0 (00166)         NOP\MOV(IOA,A0)        A0=K
A5C 083C0 40004000 (00167)         ADD(A0,A0)             2J;2K
A5D 083C2 08F10000 (00168)         MOV(IOA,A1)\NOP        A1=J'
A5E 083C4 000008F1 (00169)         NOP\MOV(IOA,A1)        A1=K'
A5F 083C6 413C413C (00170)         MOV(00),ADD(A1,A1)     2J->$6+1,2J';2K->$7+1,2K
                   (00171) ;                              '
A60 083C8 08FC0000 (00172)         MOV(IOA,00)\NOP        INSTR$4 INTO INDS4
A61 083CA 000008FC (00173)         NOP\MOV(IOA,00)        INSTR$5 INTO INDS5
A62 083CC 08FC0000 (00174)         MOV(IOA,00)\NOP        NULL=TMP2(J*)
A63 083CE 08FC0000 (00175)         MOV(IOA,00)\NOP        NULL=DCT1(J*)
A64 083D0 [illegible]C0000 (00176)         MOV(IOA,00)\NOP        NULL=TMP2(K*)
A65 083D2 08FC0000 (00177)         MOV(IOA,00)\NOP        NULL=DCT1(K*)
A66 083D4 08F20000 (00178)         MOV(IOA,A2)\NOP        A2=J''
A67 083D6 000008F2 (00179)         NOP\MOV(IOA,A2)        A2=K''
A68 083D8 425C425C (00180)         MOV(00),ADD(A2,A2)     2J'->$4+1,2J'';2K'->$5+1
                   (00181) ;                              ,2K''
A69 083DA 08FC0000 (00182)         MOV(IOA,00)\NOP        INSTR$6 INTO INDS6
A6A 083DC 000008FC (00183)         NOP\MOV(IOA,00)        INSTR$7 INTO INDS7
A6B 083DE 08FC0000 (00184)         MOV(IOA,00)\NOP        NULL=TMP2(J**)
A6C 083E0 08FC0000 (00185)         MOV(IOA,00)\NOP        NULL=DCT1(J**)
A6D 083E2 08FC0000 (00186)         MOV(IOA,00)\NOP        NULL=TMP2(K**)
A6E 083E4 08FC0000 (00187)         MOV(IOA,00)\NOP        NULL=DCT1(K**)
A6F 083E6 911D0086 (00188) SHUFLS  JUMPS(DNESA,FI)        I/O HAS SETTLED! DONE?
A70 083E8 901C0070 (00189) STALS   JUMPC(STALS,FO)        WAIT FOR OUTPUT TO CLEAR
A71 083EA 20480000 (00190)         SET(AFO)\NOP           SET OUTPUT "SKIP" FLG
A72 083EC 20500000 (00191)         SET(RO)\NOP            RELEASE APS OUTPUT
A73 083EE 08F10000 (00192)         MOV(IOA,A1)\NOP        A1=J'
A74 083F0 000008F1 (00193)         NOP\MOV(IOA,A1)        A1=K'
A75 083F2 413C413C (00194)         MOV(00),ADD(A1,A1)     2J->$6+1,2J';2K->$7+1,2K
                   (00195) ;                              '
A76 083F4 08FC0000 (00196)         MOV(IOA,00)\NOP        INSTR$4 INTO INDS4
A77 083F6 000008FC (00197)         NOP\MOV(IOA,00)        INSTR$5 INTO INDS5
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A78 083F8 08FC0000 (00198)         MOV(IOA,00)\NOP                DCT2(I)=TMP2(J*)
A79 083FA 08FC0000 (00199)         MOV(IOA,00)\NOP                TMP4(I)=DCT1(J*)
A7A 083FC 00000BFC (00200)         NOP\MOV(IOA,00)                DCT2(I+1)=TMP2(K*)
A7B 083FE 00000BFC (00201)         NOP\MOV(IOA,00)                TMP4(I+1)=DCT1(K*)
A7C 08400 08F20000 (00202)         MOV(IOA,A2)\NOP                A2=J''
A7D 08402 00000BF2 (00203)         NOP\MOV(IOA,A2)                A2=K''
A7E 08404 425C425C (00204)         MOV(00),ADD(A2,A2)             2J'->$4+1,2J'';2K'->$5+1
                   (00205) ;                                      ,2K''
A7F 08406 08FC0000 (00206)         MOV(IOA,00)\NOP                INSTR$6 INTO INDS6
A80 08408 00000BFC (00207)         NOP\MOV(IOA,00)                INSTR$7 INTO INDS7
A81 0840A 08FC0000 (00208)         MOV(IOA,00)\NOP                DCT2(I+2)=TMP2(J*)
A82 0840C 08FC0000 (00209)         MOV(IOA,00)\NOP                TMP4(I+2)=DCT1(J*)
A83 0840E 00000BFC (00210)         NOP\MOV(IOA,00)                DCT2(I+3)=TMP2(K*)
A84 08410 00000BFC (00211)         NOP\MOV(IOA,00)                TMP4(I+3)=DCT1(K*)
A85 08412 1000006F (00212)         JUMP(SHUFLS)                   "JUMP(...)" SETTLES I/O
                   (00213)
A86 08414 20300000 (00214) DNFSA   CLEAR(RO)\NOP                  APS CANNOT TURN ITSELF O
                   (00215) ;                                      FF!
A87 08416 20320000 (00216)         CLEAR(RA)\NOP                  APU DONE!
A88 08418 00000000 (00217)         NOP
          00000089 (00218)         SORTSSZ=#A-SORTSSA
    0841A          (00219)         END SORTSSZ
                   (00220)         EJECT
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                    (00221) *
                    (00222) *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00223) *
                    (00224)         EVEN
    0841A 00008516  (00225)         ADDR G106$I                      POINTER TO CONSTRUCTED I
                    (00226) ;                                        NSTRUCTION BLOCK
    0841C 00008424  (00227)         ADDR G106$+2*SCLR$               POINTER TO SCALAR BLOCK
    0841E 0000      (00228)         DATA 0                           NUMBER OF SCALARS
    0841F 00F6      (00229)         DATA G106$Z                      MODULE SIZE
    08420 00008468  (00230)         ADDR G106$A                      POINTER TO CHAIN ANCHOR
                    (00231)         EVEN                             END ON WORD BOUNDARY
                    (00232) *
                    (00233) G106$   BEGIN APS(G106)
A00 08422 00103940  (00234)         JSN(G106$I,P1)                   SET INPUT PC(P1)
A01 08424 02C28300  (00235) SCLR$   LOAD(BR0,T1$(1),TF)              IQ=T1
A02 08426 04C28302  (00236)         LOAD(BR0,T2$(1),TF)              IQ=T2
A03 08428 06C28304  (00237)         LOAD(BR0,T3$(1),TF)              IQ=T3
A04 0842A 09420503  (00238)         LOAD(BR0,1SAS01(1),TF)           IQ=1
A05 0842C 0AC60A00  (00239)         LOAD(BR0,TMP2$(3),TF)            IQ=TMP2(0)
A06 0842E 0C5000FF  (00240)         LOAD(BR1,SIZE$)                  TMP2(,) SIZE-1
A07 08430 0E641F23  (00241)         LOAD(BR2,INTGR$-1(2))            TABL(,) BA-1
A08 08432 108A0002  (00242) IINC$I  ADD(BR0,W$,TF)                   IQ=TMP2(I+1)
A09 08434 132A0001  (00243)         ADD(BR2,H$,TF)                   IQ=TABL(I)=I
A0A 08436 141908B1  (00244)         SUBL(BR1,1),JUMPP(IINC$I)        FOR I=0,1,2...LTH-1
A0B 08438 16300037  (00245)         SET(W1)                          STALL APS INPUT
A0C 0843A 18500002  (00246)         LOAD(BR1,2)                      3+1=4 OVERWRITES
A0D 0843C 1AC41F14  (00247)         LOAD(BR0,INSTR$0(2),TF)          IQ="LOAD(BR1,M$$)"
A0E 0843E 1C8A0002  (00248) #1      ADD(BR0,W$,TF)                   IQ="LOAD(BR1,M$$)"
A0F 08440 1E190FB1  (00249)         SUBL(BR1,1),JUMPP(#1)            INS2,INS1 & INS0
A10 08442 20300037  (00250)         SET(W1)                          STALL APS INPUT
A11 08444 22460FFF  (00251) L3$SU   LOAD(BR0,TABL$3-1(3))            TABLE3(,) BA-1
A12 08446 24500000  (00252) INS3    LOAD(BR1,M$$)                    M$$=LEVEL 3 COUNT
A13 08448 261915F1  (00253) TSTSL3  SUBL(BR1,1),JUMPN(L2$SU)         PICKUP TILL NO MORE
A14 0844A 29091379  (00254)         ADDL(BR0,H$,TF),JUMP(TSTSL3)     IQ=TABLE3(I)
A15 0844C 2A460DFF  (00255) L2$SU   LOAD(BR0,TABL$2-1(3))            TABLE2(,) BA-1
A16 0844E 2C500000  (00256) INS2    LOAD(BR1,M$$)                    M$$=LEVEL 2 COUNT
A17 08450 2F1919F1  (00257) TSTSL2  SUBL(BR1,1),JUMPN(L1$SU)         PICKUP TILL NO MORE
A18 08452 31091779  (00258)         ADDL(BR0,H$,TF),JUMP(TSTSL2)     IQ=TABLE2(I)
A19 08454 32460CFF  (00259) L1$SU   LOAD(BR0,TABL$1-1(3))            TABLE1(,) BA-1
A1A 08456 34500000  (00260) INS1    LOAD(BR1,M$$)                    M$$=LEVEL 1 COUNT
A1B 08458 36191DF1  (00261) TSTSL1  SUBL(BR1,1),JUMPN(L0$SU)         PICKUP TILL NO MORE
A1C 0845A 39091B79  (00262)         ADDL(BR0,H$,TF),JUMP(TSTSL1)     IQ=TABLE1(I)
A1D 0845C 3A460BFF  (00263) L0$SU   LOAD(BR0,TABL$0-1(3))            TABLE0(,) BA-1
A1E 0845E 3C500000  (00264) INS0    LOAD(BR1,M$$)                    M$$=LEVEL 0 COUNT
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A1F 08460 3F1921F1 (00265) TSTSLO  SUBL(BR1,1),JUMPN(STALSI)             PICKUP TILL NO MORE
A20 08462 41091F79 (00266)         ADDL(BR0,HS,TF),JUMP(TSTSLO)          IQ=TABLE0(I)
A21 08464 42300037 (00267) STALSI  SET(WI)                               STALL APS INPUT
A22 08466 44500103 (00268)         LOAD(BF1,SIZES+4)                     IORDR(.) SIZE-1+4
                   (00269) *
A23 08468 47400000 (00270)         LOAD(BR0,IO),TF)                      IORDR(.) BA,IQ=IORDR=J
A24 0846A 48600000 (00271)         LOAD(BR2,MSS)                         DUMMY OP FOR EXEC
A25 0846C 480A0000 (00272)         ADD(BR0,MSS,TF)                       IQ=IORDR(I)=K
A26 0846E 4D0A0001 (00273) INDSJ   ADD(BR0,HS,TF)                        IQ=J'=IORDR(I+2)
A27 08470 4F0A0001 (00274)         ADD(BR0,HS,TF)                        IQ=K'=IORDR(I+3)
A28 08472 50F41F1C (00275)         LOAD(BR2,INSTRS4(2),TF)               OVERWRITE INDS4
A29 08474 52F41F1F (00276)         LOAD(BR2,INSTRS5(2),TF)               OVERWRITE INDS5
A2A 08476 54600000 (00277)         LOAD(BR2,MSS)                         RESET BR2 TO 0!
A2B 08478 562F0000 (00278) INDS6   ADD(BR2,MSS,NA,C)                     MSS=2J,PC->PC1
A2C 0847A 58600000 (00279)         LOAD(BR2,MSS)                         RESET BR2 TO 0!
A2D 0847C 5A2F0000 (00280) INDS7   ADD(BR2,MSS,NA,C)                     MSS=2J,PC->PC1
A2E 0847E 5D0A0001 (00281)         ADD(BR0,HS,TF)                        IQ=J''
A2F 08480 5F0A0001 (00282)         ADD(BR0,HS,TF)                        IQ=K''
A30 08482 60F41F20 (00283)         LOAD(BR2,INSTRS6(2),TF)               OVERWRITE INDS6
A31 08484 62F41F22 (00284)         LOAD(BR2,INSTRS7(2),TF)               OVERWRITE INDS7
A32 08486 64600000 (00285)         LOAD(BR2,MSS)                         RESET BR2 TO 0!
A33 08488 662F0000 (00286) INDS4   ADD(BR2,MSS,NA,C)                     MSS=2J,PC->PC1
A34 0848A 68600000 (00287)         LOAD(BR2,MSS)                         RESET BR2 TO 0!
A35 0848C 6A2F0000 (00288) INDS5   ADD(BR2,MSS,NA,C)                     MSS=2J,PC->PC1
A36 0848E 6C1926B4 (00289)         SUBL(BR1,4),JUMPP(INDSJ)              FOR I=0,1,2...LTH+1
                   (00290) *
A37 08490 6F200031 (00291) DNFSI   CLEAR(RI)                             INPUT DONE!
A38 08492 70000020 (00292)         NOP
A39 08494 72204040 (00293) G106S1  JSN(G106S0,P2)                        SET OUTPUT PC
A3A 08496 74760A00 (00294) TOPSP1  LOAD(BR3,TMP2S(3))                    TMP2(.) BA
A3B 08498 76B9002D (00295)         ADDB(BR3,BR2,TF)                      IQ=TMP2(J* OR K*)
A3C 0849A 78760200 (00296)         LOAD(BR3,DCT1S(3))                    DCT1(.) BA
A3D 0849C 7AB9002D (00297)         ADDB(BR3,BR2,TF)                      IQ=DCT1(J* OR K*)
A3E 0849E 7C2F0000 (00298)         ADD(BR2,MSS,NA,C)                     PC->PC0
A3F 084A0 7E003A60 (00299)         JUMP(TOPSP1)                          RESET PC AND SETTLE
                   (00300) *
A40 084A2 80306D40 (00301) G106S0  JSN(G106S3,P3)                        SET OUTPUT PC(PC3)
A41 084A4 82460BFF (00302)         LOAD(BW0,TABLS0-1(3))                 TABLE0(.) BA-1
A42 084A6 84560CFF (00303)         LOAD(BW1,TABLS1-1(3))                 TABLE1(.) BA-1
A43 084A8 86660DFF (00304)         LOAD(BW2,TABLS2-1(3))                 TABLE2(.) BA-1
A44 084AA 88760EFF (00305)         LOAD(BW3,TABLS3-1(3))                 TABLE3(.) BA-1
A45 084AC 8A0053F5 (00306) FLGSTST JUMPS(SETSCUT,G1)                     G1=1,SET LEVEL COUNTS
A46 084AE 8C004BF8 (00307)         JUMPS(INSRTS0,AF0)                    AF0=1 THEN LEVEL 0
A47 084B0 8E004DF9 (00308)         JUMPS(INSRTS1,AF1)                    AF1=1 THEN LEVEL 1
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A48 084B2 90004FFA (00309)         JUMPS(INSRTS2,AF2)                 AF2=1 THEN LEVEL 2
A49 084B4 92005IFB (00310)         JUMPS(INSRTS3,AF3)                 AF3=1 THEN LEVEL 3
A4A 084B6 94004560 (00311)         JUMP(FLGSTST)                      RE-TEST ALL FLAGS
A4B 084B8 9620002B (00312) INSRTS0 CLEAR(AF0)                         RELEASE APU
A4C 084BA 99014579 (00313)         ADDL(BW0,HS,TF),JUMP(FLGSTST)      OQ=TABLE0(II),II=II+1
A4D 084BC 9A200029 (00314) INSRTS1 CLEAR(AF1)                         RELEASE APU
A4E 084BE 9D114579 (00315)         ADDL(BW1,HS,TF),JUMP(FLGSTST)      OQ=TABLE1(JJ),JJ=JJ+1
A4F 084C0 9F20002A (00316) INSRTS2 CLEAR(AF2)                         RELEASE APU
A50 084C2 A1214579 (00317)         ADDL(BW2,HS,TF),JUMP(FLGSTST)      OQ=TABLE2(KK),KK=KK+1
A51 084C4 A220002B (00318) INSRTS3 CLEAR(AF3)                         RELEASE APU
A52 084C6 A5314579 (00319)         ADDL(BW3,HS,TF),JUMP(FLGSTST)      OQ=TABLE3(LL),LL=LL+1
A53 084C8 A6500007 (00320) SETSCNT LOAD(BW1,7)                        8 "INSTR" WORDS...
A54 084CA A8441F13 (00321)         LOAD(BW0,INSTRS0-1(2))             TO BE SET OR CLEARED
A55 084CC AB0A0002 (00322) #1      ADD(BW0,WS,TF)                     OQ=INSTRS#+1
A56 084CE AC1155B1 (00323)         SUBL(BW1,1),JUMPP(#1)              FOR I=0,1,2...7
A57 084D0 AF200030 (00324)         CLEAR(RO)                          STALL APS OUTPUT
A58 084D2 B0500003 (00325)         LOAD(BW1,3)                        3+1=4 SCATTER WRITES
A59 084D4 B2C3FFC0 (00326) #2      LOAD(BW0,APSSMEM(1),TF)            INSTRS# OVERWRITE
A5A 084D6 B41159B1 (00327)         SUBL(BW1,1),JUMPP(#2)              FOR I=0,1...3
A5B 084D8 B6200030 (00328)         CLEAR(RO)                          STALL APS OUTPUT
A5C 084DA B8000020 (00329)         NOP                                RELEASED BY APU
A5D 084DC BB460000 (00330)         LOAD(BW0,IORDRS(3),TF)             IORDR(,) BA,OQ=IORDR(0)
A5E 084DE BC500108 (00331)         LOAD(BW1,SIZES+OVRSLAP-1)          IORDR(,) SIZE-2+OVERLAP
A5F 084E0 BF0A0001 (00332) RDSOUT  ADD(BW0,HS,TF)                     OQ=IORDR(I)
A60 084E2 C0115FB1 (00333)         SUBL(BW1,1),JUMPP(RDSOUT)          FOR I=1,2...LTH-1;+10 O'
                   (00334) ;                                          S
                   (00335) *
A61 084E4 C24603FF (00336)         LOAD(BW0,DCT2S-2(3))               DCT2(,) BA-2
A62 084E6 C4760BFF (00337)         LOAD(BW3,TMP4S-2(3))               TMP4(,) BA-2
A63 084E8 C6000020 (00338) INDS1   NOP                                LET "JUMP(...)" SETTLE
A64 084EA C9641F21 (00339)         LOAD(BW2,INSTRS6+1(2),TE)          SET MSS IN INSTRS6
A65 084EC CB641F23 (00340)         LOAD(BW2,INSTRS7+1(2),TF)          SET MSS IN INSTRS7
A66 084EE CCE3FFC0 (00341)         LOAD(BW2,APSSMEM(1),TF)            OVERWRITE INDS4
A67 084F0 CFAF0000 (00342)         ADD(BW2,MSS,TF,C)                  OVERWRITE INDS5;PC3->PC
A68 084F2 D1641E1D (00343)         LOAD(BW2,INSTRS4+1(2),TE)          SET MSS IN INSTRS4
A69 084F4 D3641E1F (00344)         LOAD(BW2,INSTRS5+1(2),TE)          SET MSS IN INSTRS5
A6A 084F6 D4E3FFC0 (00345)         LOAD(BW2,APSSMEM(1),TF)            OVERWRITE INDS6
A6B 084F8 D6AF0000 (00346)         ADD(BW2,MSS,TF,C)                  OVERWRITE INDS7;PC3->PC
A6C 084FA D8206370 (00347)         JUMP(INDS1,RO),CLEAR               RESET & STALL
A6D 084FC DA300037 (00348) G106S3  SET(RA)                            ENABLE APU
A6E 084FE DC006020 (00349) TOPSP3  NOP                                LET "JUMP(...)" SETTLE!
A6F 08500 DF0076AB (00350)         JUMPC(DWYSFIL,AF0)                 WAIT FOR "SKIP" FLAG
A70 08502 E0BA0002 (00351)         ADD(BW0,WS,TF)                     OQ=DCT2(J*)
A71 08504 E2BA0002 (00352)         ADD(BW3,WS,TF)                     OQ=TMP4(J*)=DCT1T(J*)
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A72 08506 F48A0002 (00353)         ADD(BW0,WS,TF)                  00=DCT2(K*)
A73 08508 F6BA0002 (00354)         ADD(BW3,WS,TF)                  00=TMP4(K*)=DCT1T(K*)
A74 0850A F82F0000 (00355) CHNGSPC ADD(BW2,MSS,C)                  NO IO! CHANGE PC
A75 0850C FA006F60 (00356)         JUMP(TOPSP3)                    RESET PC AND SETTLE
A76 0850F FCF20794 (00357) DMYSFIL LOAD(BW2,DMYS(1),TF)            00=?
A77 08510 FFAA0000 (00358)         ADD(BW2,MSS,TF)                 00=?
A78 08512 F0AA0000 (00359)         ADD(BW2,MSS,TF)                 00=?
A79 08514 F2A1747B (00360)         ADDL(BW2,MSS,TF),JUMP(CHNGSPC)  00=? THEN CHANGE PC
                   (00361) *
          00008468 (00362)         G106SA= #C                      ASSIGN VALUE TO CHAIN AN
                   (00363) ;                                       CHOR
    08516          (00364)         END #A-1
                   (00365) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    08516 00000000 (00366) G106ST  DATA 1F'0,0'
          000000F6 (00367)         G106SZ=#L-G106S
    08518          (00368)         END
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AFDTSORG:   00BFB (00008) (00038)
APSSMEM:    1FFC0 (00009) (00326) (00341) (00345)
CHNGSPC:    00074 (00355) (00360)
CNTSOUT:    0003A (00101) (00111) (00121) (00132)
CSPUSNOS:   021FC (00010) (00041)
DCTS:       00928 (00011)
DCT1S:      00200 (00012) (00296)
DCT2S:      00400 (00013) (00336)
DMYS:       00794 (00014) (00357)
DMYSFIL:    00076 (00350) (00357)
DNESA:      00086 (00188) (00214)
DNESI:      00037 (00291)
FLGSTST:    00045 (00306) (00311) (00313) (00315) (00317) (00319)
G106S:      08427 (00040) (00227) (00233) (00367)
G106S1:     00039 (00234) (00293)
G106S3:     0006D (00301) (00348)
G106SA:     0846B (00230) (00362)
G106SI:     08516 (00225) (00366)
G106SD:     00040 (00293) (00301)
G106SZ:     000F6 (00229) (00367)
HS:         00001 (00016) (00243) (00254) (00258) (00262) (00266) (00273) (00274) (00281) (00282)
                  (00313) (00315) (00317) (00319) (00332)
IINCS1:     00008 (00242) (00244)
INS0:       0001F (00049) (00264)
INS1:       0001A (00050) (00260)
INS2:       00016 (00051) (00256)
INS3:       00012 (00052) (00252)
INCS1:      0000C (00086) (00100) (00110) (00120) (00130)
INCRES:     00100 (00017) (00029) (00030) (00031)
INDS4:      00033 (00053) (00286)
INDS5:      00035 (00054) (00288)
INDS6:      0002B (00055) (00278)
INDS7:      0002D (00056) (00280)
INDSI:      00063 (00338) (00347)
INDSJ:      00026 (00273) (00289)
INSRTS0:    0004B (00307) (00312)
INSRTS1:    0004D (00308) (00314)
INSRTS2:    0004F (00309) (00316)
INSRTS3:    00051 (00310) (00318)
INSTRS0:    01F14 (00049) (00247) (00321)
INSTRS1:    01F16 (00050)
INSTRS2:    01F18 (00051)
INSTRS3:    01F1A (00052)
INSTRS4:    01F1C (00053) (00275) (00343)
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INSTRS5:    01F1F (00054) (00276) (00344)
INSTRS6:    01F20 (00055) (00283) (00339)
INSTRS7:    01F22 (00056) (00284) (00340)
INTGRS:     01F24 (00018) (00241)
IORDRS:     00000 (00019) (00330)
ISAS00:     00502 (00021)
ISAS01:     00503 (00022) (00238)
ISVTS:      00502 (00020) (00021) (00022)
L0SSU:      0001D (00261) (00263)
L1SSU:      00019 (00257) (00259)
L2SSU:      00015 (00253) (00255)
L3SSU:      00011 (00251)
LVLS0:      00030 (00087) (00122)
LVLS1:      00026 (00088) (00112)
LVLS2:      0001C (00091) (00102)
LVLS3:      00012 (00092)
MSS:        00000 (00023) (00252) (00256) (00260) (00264) (00271) (00272) (00277) (00278) (00279)
                  (00280) (00285) (00286) (00287) (00288) (00298) (00342) (00346) (00355) (00358)
                  (00359) (00360)
ORDRS1:     00040 (00151) (00155)
OVRSLAP:    0000A (00024) (00331)
RDSOUT:     0005F (00332) (00333)
SCLRS:      00001 (00227) (00235)
SFTSCNT:    00053 (00306) (00320)
SHUFLS:     0006F (00188) (00212)
SHUFLSV:    00058 (00163)
SIZES:      000FF (00025) (00240) (00268) (00331)
SORTS:      08308 (00039) (00072)
SORTSSA:    00000 (00070) (00074) (00218)
SORTSSZ:    00089 (00071) (00218) (00219)
STALS:      00070 (00189) (00189)
STALS1:     00021 (00265) (00267)
START:      08300 (00027) (00058)
SVTS:       00382 (00026)
T1S:        08300 (00062) (00235)
T2S:        08302 (00063) (00236)
T3S:        08304 (00064) (00237)
TABLS0:     00C00 (00028) (00029) (00263) (00302)
TABLS1:     00D00 (00029) (00030) (00259) (00303)
TABLS2:     00E00 (00030) (00031) (00255) (00304)
TABLS3:     00F00 (00031) (00251) (00305)
TMP2S:      00A00 (00032) (00239) (00294)
TMP4S:      00C00 (00033) (00337)
TOPSP1:     0003A (00294) (00299)
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PAGE   13:      ECH 247... "MPSSRT(Y)"  SORT DCT1(.) COEFFICIENTS

  TOPSP3:    0006F (00349) (00356)
  TSTSL0:    0001F (00265) (00266)
  TSTSL1:    0001B (00261) (00262)
  TSTSL2:    00017 (00257) (00258)
  TSTSL3:    00013 (00253) (00254)
  WS:        00002 (00034) (00242) (00248) (00322) (00351) (00352) (00353) (00354)
  ZS:        00003 (00035)

LINES WITH ERRORS:    0  (MAP VERSION R00101.10)   E=    0
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                  (00001) '  FCB 248... "MPIDCM(Y,U,V)"      MAKHOUL IDCT CORRECTION
                  (00002) *                                   ORIGINATED:16-JAN-80
                  (00003) *                                   UPDATED:17-JUN-80
                  (00004) *  DEFINE GLOBAL SYMBOLS
                  (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                  (00006)         OPADD OOF, (3 .LS. 10) + (12 .LS. 5) + $1B
                  (00007)         OPADD WAENE, (1 .LS. 10) + (12 .LS. 5) + $1A
                  (00008)         OPADD EO, (3 .LS. 10) + (12 .LS. 5) + $1C
         000008E8 (00009)         AFDTSORG=$8E8
         00000400 (00010)         COSZS=D'1024'
         000021FC (00011)         CSPUSNOS=$21FC
         00000794 (00012)         DNYS=$794
         00000400 (00013)         DRDCTS=D'1024'
         00000003 (00014)         #M=3
         00000001 (00015)         HS=1
         00000000 (00016)         MSS=0
         000000FF (00017)         SIZES=D'256'-D'1'
         00000600 (00018)         SINZS=D'1536'
         000003B2 (00019)         SVTS=$03B2
         000003E8 (00020)         SAS27=SVTS+2*D'27'
         000003E6 (00021)         SAS50=SVTS+2*D'50'
         00000446 (00022)         SAS98=SVTS+2*D'98'
         0000044A (00023)         SAS100=SVTS+2*D'100'
         0000044C (00024)         SAS101=SVTS+2*D'101'
         00007150 (00025)         START=$7150
         00000002 (00026)         WS=2
         00000004 (00027)         WWS=4
         00000005 (00028)         WWHS=5
         00000006 (00029)         WWWS=6
         00000003 (00030)         ZS=3
         00000007 (00031)         ZZHS=7
                  (00032) *
                  (00033) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
         000008B8 (00034)         #L=AFDTSORG+3*2*(248-128)                  FCB 248
   008B8 001F7166 (00035)         ADDR IDCMS(R7,1)
   008BA 001F722A (00036)         ADDR G201S(R7,1)
   008BC 001021FC (00037)         ADDR CSPUSNOS(,1,0)
                  (00038)         EJECT
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                    (00039) *
                    (00040) *>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00041) *
          00007150  (00042)          #L=START
                    (00043)          EVEN
07150 2000003B (00044) TABLES  DATA 2.3841859E-07                  2**(-22)
07152 40000044 (00045)         DATA 3.2768000E+04                  2**15
07154 0820003D (00046)         DATA 1.5497208E-05                  4*65*16**(-6)
07156 3D86415C (00047)         DATA 0.24957274BE+34                C5
07158 12690007 (00048)         DATA 0.712208897E+27                C4
0715A 725511D1 (00049)         DATA 0.263632333E+21                C3
0715C 1EBD5ACC (00050)         DATA 0.675972338E+14                C2
0715E 8800003B (00051) TABLES2 DATA -5.9604646E-08                 -16**(-6)
07160 58893D46 (00052)         DATA 0.116291788E+08                C1
07162 7FFFFF40 (00053)         DATA 0.9999999250                   C0
                    (00054)          EJECT
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                         (00055) *
                         (00056) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                         (00057) *
                         (00058)          EVEN
    07164 0000           (00059)          DATA IDCM$SA                                 START ADDRESS
    07165 005F           (00060)          DATA IDCM$SZ                                 MODULE SIZE
                         (00061) IDCMS    BEGIN APU(IDCM)
          00000000       (00062)          #A=0
                         (00063) *
                         (00064) *  YR(K)=YR(N-K)=[COS(K)*DCT(K)+SIN(K)*DCT(N-K)]
                         (00065) *  YI(K)=-YI(N-K)=[SIN(K)*DCT(K)-COS(K)*DCT(N-K)]
                         (00066) *  WHERE COS(K) IS COS(2*PI*K/2N), SIN SIMILAR.
A00 07166 16601680 (00067) IDCM$SA K(1)
A01 07168 08FC0000 (00068)          MOV(IOA,00)\NOP                              DCT(0)=C(0)
A02 0716A 08FC08FC (00069)          MOV(IOA,M4)                                  C(N/2)
A03 0716C 08F808F8 (00070)          MOV(IOA,M0)                                  COS(N/2)
A04 0716E 00008400 (00071)          NOP\MUL(M0,M4)                               COS(N/2)*C(N/2)
A05 07170 000008B0 (00072)          NOP\MOV(P,A0)                                COS*C (=.5*DCT(N/2)
A06 07172 088F400F (00073)          MOV(R,M7)\MOV(M7),ADD(A0,A0)                 STORE 1;2*COS*C
A07 07174 081C089C (00074)          MOV(ZERO,00)\MOV(R,00)                       YI(0)\YR(N/2)
A08 07176 081C0000 (00075)          MOV(ZERO,00)\NOP                             YI(N/2)
A09 07178 08FC08FC (00076)          MOV(IOA,M4)                                  C(K) (K STARTS AT N/2-1)
A0A 0717A 08FD08FD (00077)          MOV(IOA,M5)                                  C(N-K)
A0B 0717C 08F808F8 (00078)          MOV(IOA,M0)                                  COS(K)
A0C 0717E 08F908F9 (00079)          MOV(IOA,M1)                                  SIN(K)
A0D 07180 84008480 (00080)          MUL(M0,M4)\MUL(M1,M4)                        COS*C(K)\SIN*C(K)
A0E 07182 84808430 (00081)          MOV(A0),MUL(M1,M5)\MOV(A0),MUL(M0,M5)        SIN*C(N-K)\COS*C(N-K)
A0F 07184 08FC08FC (00082)          MOV(IOA,M4)                                  NEXT C(K)
A10 07186 08A008A0 (00083)          MOV(P,NULL)                                  MAKE SURE ITS DONE
A11 07188 08FD08FD (00084)          MOV(IOA,M5)                                  NEXT C(N-K)
A12 0718A 08F808F8 (00085)          MOV(IOA,M0)                                  NEXT COS(K)
A13 0718C 08F908F9 (00086)          MOV(IOA,M1)                                  NEXT SIN(K)
A14 0718E 84118491 (00087) IDCLP    MOV(A1),MUL(M0,M4)\MOV(A1),MUL(M1,M4)        LAST TIMES C(N-K) TERMS,
A15 07190 41004900 (00088)          ADD(A0,A1)\SUB(A0,A1)                        MAKE YR(K)\YI(K)
A16 07192 088B088B (00089)          MOV(R,M3)                                    NEED TO TAKE HALF OF THE
                   (00090) ;                                                     SE RESULTS
A17 07194 85F085F0 (00091)          MOV(A0),MUL(M3,M7)                           STORE COS*C(K),YR(K)*.5\
                   (00092) ;                                                     SIN*C(K);.5*YI(K)
A18 07196 84B8843B (00093)          MOV(EXD),MUL(M1,M5)\MOV(EXD),MUL(M0,M5)      SAVE YR,YI;SIN*C(K)\COS*
                   (00094) ;                                                     C(N-K)
A19 07198 0853085C (00095)          MOV(EXI,A3)\MOV(EXI,00)                      YI(K)\YR(K) OUT
A1A 0719A 0A600000 (00096)          NEG(A3)\NOP                                  GET YI(N-K)
A1B 0719C 085C085C (00097)          MOV(EXI,00)\MOV(EXI,00)                      YI(K)\YR(N-K (=YR(K))
A1C 0719E 089C0000 (00098)          MOV(R,00)\NOP                                YI(N-K)
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A1D 071A0 08FC08FC (00099)        MOV(IOA,M4)                  NEXT C(K)
A1E 071A2 08FD08FD (00100)        MOV(IOA,M5)                  NEXT C(N-K)
A1F 071A4 08F808F8 (00101)        MOV(IOA,M0)                  NEXT COS(K)
A20 071A6 08F908F9 (00102)        MOV(IOA,M1)                  NEXT SIN(K)
A21 071A8 00000000 (00103)        NOP
A22 071AA 90160014 (00104)        JUMPC(IDCLP,FWI)
A23 071AC 20372037 (00105)        CLEAR(WI)
                   (00106) *
A24 071AE 00000000 (00107)        NOP
A25 071B0 08F80000 (00108) SMULS  MOV(IOA,M0)\NOP              M0=VAR''
A26 071B2 08FD0000 (00109)        MOV(IOA,M5)\NOP              M5=1.0/20.0=0.05
A27 071B4 84200000 (00110)        MUL(M0,M5)\NOP               0.05*VAR''
A28 071B6 08BC0000 (00111)        MOV(P,OQ)\NOP                OQ=VAR'''=0.05*VAR''
A29 071B8 20372037 (00112)        CLEAR(WI)                    RELEASE APS INPUT
                   (00113) *
A2A 071BA 08FB08FB (00114) EXPS   MOV(IOA,M3)                  M3=SA TEMPORARILY
A2B 071BC 08FC08FC (00115)        MOV(IOA,M4)                  M4=2**(-22) TEMPORARILY
A2C 071BE 85808580 (00116)        MUL(M3,M4)
A2D 071C0 08FD08FD (00117)        MOV(IOA,M5)                  M5=2**(15)
A2E 071C2 08F408F4 (00118)        MOV(IOA,A4)                  A4=4*65*16**(-6)
A2F 071C4 08F908F9 (00119)        MOV(IOA,M1)                  M1=C5
A30 071C6 08F708F7 (00120)        MOV(IOA,A7)                  A7=C4
A31 071C8 08F608F6 (00121)        MOV(IOA,A6)                  A6=C3
A32 071CA 08F508F5 (00122)        MOV(IOA,A5)                  A5=C2
A33 071CC 08AC08AC (00123)        MOV(P,M4)                    M4=SA*2**(-22)
A34 071CE 08FA0000 (00124) #1     MOV(IOA,M2)\NOP              M2=X(0,K)=VAR'''
A35 071D0 851C0000 (00125)        MOV(OQ),MUL(M2,M4)\NOP       OQ=X(19,K-2)=VAR,X(1,K)
A36 071D2 3A6B3A6B (00126)        MOV(M3),ALIGN(A3)            A3=X(9,K-1),X(7,K-1)
A37 071D4 1F731F73 (00127)        MOV(A3),EXP(A3)              A3=X(7,K-1),X(10,K-1)
A38 071D6 85D185D1 (00128)        MOV(A1),MUL(M3,M6)           A1=X(1,K),X(11,K-1)
A39 071D8 3A283A28 (00129)        MOV(M0),ALIGN(A1)            M0=X(10,K-1),X(2,K)
A3A 071DA 32523252 (00130)        MOV(A2),NORM(A2)             A2=X(2,K),X(3A,K)
A3B 071DC 08B308B3 (00131)        MOV(P,A3)                    A3=X(11,K-1)
A3C 071DE 46704670 (00132)        MOV(A0),ADD(A3,A6)           A0=X(3A,K),X(12,K-1)
A3D 071E0 022B022B (00133)        MOV(M3),R(A1)                M3=X(12,K-1),SET T BIT B
                   (00134) ;                                   Y X(3A,K)
A3E 071E2 85C085C0 (00135)        MUL(M3,M6)                   X(13,K-1)
A3F 071E4 08F208F2 (00136)        MOV(IOA,A2)                  A2=-16**(-6)
A40 071E6 5A005A00 (00137)        ADDLT(A0,A2)                 X(3B,K)
A41 071E8 08B308B3 (00138)        MOV(P,A3)                    A3=X(13,K-1)
A42 071EA 45704570 (00139)        MOV(A0),ADD(A3,A5)           A0=X93B,K),X(14,K-1)
A43 071EC 44084408 (00140)        MOV(M3),ADD(A0,A4)           M3=X(A4,K-1),X(4,K)
A44 071EE 85C085C0 (00141)        MUL(M3,M6)                   X(15,K-1)
A45 071F0 08F208F2 (00142)        MOV(IOA,A2)                  A2=C1
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A46 071F2 0BBA0BBA (00143)            MOV(R,M2)                  M2=X(4,K)
A47 071F4 B533B533 (00144)            MOV(A3),MUL(M2,M5)         A3=X(15,K-1),X(5,K)
A48 071F6 43404340 (00145)            ADD(A2,A3)                 X(16,K-1)
A49 071F8 4B2B4B2B (00146)            MOV(M3),SUB(A1,A0)         M3=X(16,K-1),X(6,K)
A4A 071FA B5D3B5D3 (00147)            MOV(A3),MUL(M3,M6)         A3=X(5,K),X(17,K-1)
A4B 071FC 0BF20BF2 (00148)            MOV(IOA,A2)                A2=C0
A4C 071FE 0BB00BB0 (00149)            MOV(R,NULL)
A4D 07200 0BB10BB1 (00150)            MOV(P,A1)                  A1=X(17,K-1)
A4E 07202 0BBE0BBE (00151)            MOV(R,M6)                  M6=X(6,K)
A4F 07204 B4C0B4C0 (00152)            MUL(M1,M6)                 X(8,K)
A50 07206 42204220 (00153)            ADD(A1,A2)                 X(18,K-1)
A51 07208 0BBF0BBF (00154)            MOV(R,M7)                  M7=X(18,K-1)
A52 0720A B4718471 (00155)            MOV(A1),MUL(M0,M7)         A1=X(8,K),X(19,K-1)
A53 0720C 47204720 (00156)            ADD(A1,A7)                 X(9,K)
A54 0720E 90160034 (00157)            JUMPC(#1,FWI)              WAIT FOR DELAY
A55 07210 20372037 (00158)            CLEAR(WI)                  RELEASE APS INPUT
                   (00159) *
A56 07212 0BFB0000 (00160) DCS        MOV(IOA,M0)\NOP            M0=DC'
A57 07214 0BFD0BFD (00161)            MOV(IOA,M5)                M5=VAR
A58 07216 00000BFB (00162)            NOP\MOV(IOA,M0)            M0=2**(-MLONG)
A59 07218 84208420 (00163)            MUL(M0,M5)                 DC'*VAR;2**(-MLONG)*VAR
A5A 0721A 0BBC0BBC (00164)            MOV(P,O0)                  O0=DC=DC'*VAR;VAR'=2**(-
                   (00165) ;                                     MLONG)*VAR
                   (00166) *
A5B 0721C 20320000 (00167) DNESA      CLEAR(RA)\NOP              APU DONE!
A5C 0721E 00000000 (00168)            NOP
A5D 07220 10000000 (00169)            JUMP(0)
          0000005F (00170)            IDCMSSZ=#A-IDCMSSA
    07222          (00171)            END IDCMSSZ
                   (00172)            EJECT
```

```
                       (00173) *
                       (00174) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                       (00175) *
                       (00176)         EVEN
    07222 000072C6     (00177)         ADDR G201$I                          POINTER TO CONSTRUCTED I
                       (00178) ;                                            NSTRUCTION BLOCK
    07224 0000722C     (00179)         ADDR G201$+2*SCLR$                   POINTER TO SCALAR BLOCK
    07226 0000         (00180)         DATA 0                               NUMBER OF SCALARS
    07227 00A2         (00181)         DATA G201$Z                          MODULE SIZE
    07228 0000729A     (00182)         ADDR G201$A                          POINTER TO CHAIN ANCHOR
                       (00183)         EVEN                                 END ON WORD BOUNDARY
                       (00184) *
                       (00185) G201$   BEGIN APS(G201)
A00 0722A 00203740     (00186)         JSN(G201$0,P2)                       SET OUTPUT PC(P2)
A01 0722C 02300030     (00187) SCLR$   SET(RO)                              ENABLE OUTPUT ADDRESSING
A02 0722E 04402000     (00188)         LOAD(BR0,[2])                        COS(0)
A03 07230 06500000     (00189)         LOAD(BR1,MSS)                        N-1
A04 07232 08600000     (00190)         LOAD(BR2,MSS)                        DUMMY
A05 07234 0AE01006     (00191)         LOAD(BR2,[1],TF)                     C(0)
A06 07236 0C700000     (00192)         LOAD(BR3,MSS)                        DUMMY
A07 07238 0E700000     (00193)         LOAD(BR3,MSS)                        DUMMY
A08 0723A 10190039     (00194)         ADDL(BR1,1)                          N
A09 0723C 12A9002B     (00195)         ADDB(BR2,BR1,TF)                     C(N/2)
A0A 0723E 1489002B     (00196)         ADDB(BR0,BR1,TF)                     COS(N/2) (=PI/4)
A0B 07240 1619002B     (00197)         ADDB(BR1,BR1)                        2N
A0C 07242 18090023     (00198)         SUBB(BR0,BR1)                        COS(-N/2)
A0D 07244 1A390015     (00199)         MOVB(BR3,BR2)                        C(N/2)
A0E 07246 1C09003A     (00200)         ADDL(BR0,2)                          COS(-N/2+1)
A0F 07248 1E190035     (00201)         SUBL(BR1,5)                          4*(N-1)-1
                       (00202) * LOOP
A10 0724A 20190039     (00203) #1      ADDL(BR1,1)                          FIX FROM LOOP TEST
A11 0724C 22A20002     (00204)         SUB(BR2,2,TF)                        C(K)
A12 0724E 24BA0002     (00205)         ADD(BR3,2,TF)                        C(N-K)
A13 07250 2689002B     (00206)         ADDB(BR0,BR1,TF)                     COS(K)
A14 07252 28090023     (00207)         SUBB(BR0,BR1)
A15 07254 2A8A0200     (00208)         ADD(BR0,2*256,TF)                    SIN(K)=COS(N-K)
A16 07256 2C0201FE     (00209)         SUB(BR0,2*256-2)                     C(-NEW K)
A17 07258 2E1910B5     (00210)         SUBL(BR1,5),JUMPP(#1)
A18 0725A 30500006     (00211)         LOAD(BR1,6)
A19 0725C 32C20794     (00212) #2      LOAD(BR0,DMYS(1),TF)                 NEED 8 DUMMIES
A1A 0725E 341919B1     (00213)         SUBL(BR1,1),JUMPP(#2)
A1B 07260 36C20794     (00214)         LOAD(BR0,DMYS(1),TF)
A1C 07262 38300037     (00215)         SET(WI)                              STALL APS INPUT
A1D 07264 3A000020     (00216)         NOP                                  NOTE:6 DUMMIES ARE NEEDE
```

```
                        (00217) ;                                                         D
                        (00218) *
A1E 07266 3CC2041C (00219) IMULS   LOAD(BR0,SAS101(1),TF)                           IQ=VAR''
A1F 07268 3EC20446 (00220)         LOAD(BR0,SAS98(1),TF)                            IQ=1.0/20.=0.05
A20 0726A 40300037 (00221)         SET(WI)                                          STALL APS INPUT
A21 0726C 42000020 (00222)         NOP
                        (00223) *
A22 0726E 44C203BB (00224) IEXPS   LOAD(BR0,SAS27(1),TF)                            IQ=LOG16(10.0)
A23 07270 46C27150 (00225)         LOAD(BR0,TABLES(1),TF)                           IQ=2**(-22)
A24 07272 48BA0002 (00226)         ADD(BR0,WS,TF)                                   IQ=2**15
A25 07274 4ABA0002 (00227)         ADD(BR0,WS,TF)                                   IQ=4*65*16**(-6)
A26 07276 4CBA0002 (00228)         ADD(BR0,WS,TF)                                   IQ=C5
A27 07278 4EBA0002 (00229)         ADD(BR0,WS,TF)                                   IQ=C4
A28 0727A 50BA0002 (00230)         ADD(BR0,WS,TF)                                   IQ=C3
A29 0727C 52BA0002 (00231)         ADD(BR0,WS,TF)                                   IQ=C2
A2A 0727E 54700002 (00232)         LOAD(BR3,WS)                                     3LOOPS @ 4 IQ'S=12 IQ'S
A2B 07280 56E2044C (00233) #1      LOAD(BR2,SAS101(1),TF)                           IQ=VAR'''
A2C 07282 58C2715F (00234)         LOAD(BR0,TABLES2(1),TF)                          IQ=-16**(-6)
A2D 07284 5ABA0002 (00235)         ADD(BR0,WS,TF)                                   IQ=C1
A2E 07286 5CBA0002 (00236)         ADD(BR0,WS,TF)                                   IQ=C0
A2F 07288 5E392BB1 (00237)         SUBL(BR3,1),JUMPP(#1)                            FOR I=0,1...3
A30 0728A 60300037 (00238)         SET(WI)
A31 0728C 62000020 (00239)         NOP
                        (00240) *
A32 0728E 64C2044A (00241) IDCS    LOAD(BR0,SAS100(1),TF)                           IQ=DC'
A33 07290 66C2044C (00242)         LOAD(BR0,SAS101(1),TF)                           IQ=VAR
A34 07292 68E203E6 (00243)         LOAD(BR2,SAS50(1),TF)                            SA=2**(-MLONG)
                        (00244) *
A35 07294 6A200031 (00245) DNEST   CLEAR(RI)                                        INPUT DONE!
A36 07296 6C000020 (00246)         NOP
                        (00247) *
A37 07298 6E300032 (00248) G201SD  SET(RA)                                          ENABLE APU
A38 0729A 70C00066 (00249)         LOAD(BW0,IQ1,TF)                                 YR(0)
A39 0729C 72500000 (00250)         LOAD(BW1,MSS)                                    N-1
A3A 0729E 74600000 (00251)         LOAD(BW2,MSS)                                    DUMMY
A3B 072A0 76BA0002 (00252)         ADD(BW0,2,TF)                                    YI(0)
A3C 072A2 7B11002A (00253)         ADDB(BW1,BW1)                                    2N-2
A3D 072A4 7AB1002A (00254)         ADDB(BW0,BW1,TF)                                 YR(N/2)
A3E 072A6 7CBA0002 (00255)         ADD(BW0,2,TF)                                    YI(N/2)
A3F 072A8 7E210010 (00256)         MOVB(BW2,BW0)                                    YI(N/2)
A40 072AA 80110033 (00257)         SUBL(BW1,3)                                      4*(N/2-1)-1
A41 072AC 82B20006 (00258) #2      SUB(BW0,6,TF)                                    YR(K)
A42 072AE 84BA0002 (00259)         ADD(BW0,2,TF)                                    YI(K)
A43 072B0 86AA0002 (00260)         ADD(BW2,2,TF)                                    YR(N-K)
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```
 A44 072B2 86AA0002 (00261)          ADD(BW2,2,TF)                          YI(N-K)
 A45 072B4 8A1141B4 (00262)          SUBL(BW1,4),JUMPP(#2)
                    (00263) *
 A46 072B6 8CC2044C (00264) OMULS    LOAD(BW0,SAS101(1),TF)                 OO=VAR'''
                    (00265) *
 A47 072B8 8EC20794 (00266) OEXPS    LOAD(BW0,DMYS(1),TF)                   OO=?
 A48 072BA 90C20794 (00267)          LOAD(BW0,DMYS(1),TF)                   OO=?
 A49 072BC 92C2044C (00268)          LOAD(BW0,SAS101(1),TF)                 OO=VAR
                    (00269) *
 A4A 072BE 94C2044A (00270) ODCS     LOAD(BW0,SAS100(1),TF)                 OO=DC
 A4B 072C0 96C2044C (00271)          LOAD(BW0,SAS101(1),TF)                 OO=VAR
                    (00272) *
 A4C 072C2 98200030 (00273) DNESO    CLEAR(R0)                              OUTPUT DONE!
 A4D 072C4 9A000020 (00274)          NOP
                    (00275) *
           0000729A (00276)          G201$A= #C                             ASSIGN VALUE TO CHAIN AN
                    (00277) ;                                               CHOR
     072C6          (00278)          END #A-1
                    (00279) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
     072C6 00000000 (00280) G201$I   DATA 3F'0,0'
      ...
           000000A2 (00281)          G201$Z=#L-G201$
     072CC          (00282)          END
```

```
AFDTSORG:   008EB (00009) (00034)
COS7S:      00400 (00010)
CSPUSNOS:   021FC (00011) (00037)
DCS:        00056 (00160)
DMYS:       00794 (00012) (00212) (00214) (00266) (00267)
DNFSA:      0005B (00167)
DNFS1:      00035 (00245)
DNFSO:      0004C (00273)
DRDCTS:     00400 (00013)
FXPS:       0002A (00114)
G201S:      0722A (00036) (00179) (00185) (00281)
G201SA:     0729A (00182) (00276)
G201S1:     072C6 (00177) (00280)
G201SO:     00037 (00186) (00248)
G201SZ:     000A2 (00181) (00281)
HS:         00001 (00015)
IDCS:       00032 (00241)
IDCLP:      00014 (00087) (00104)
IDCMS:      07166 (00035) (00061)
IDCMSSA:    00000 (00059) (00067) (00170)
IDCMSSZ:    0005F (00060) (00170) (00171)
IFXPS:      00022 (00224)
IMULS:      0001F (00219)
MSS:        00000 (00016) (00189) (00190) (00192) (00193) (00250) (00251)
ODCS:       0004A (00270)
OFXPS:      00047 (00266)
OMULS:      00046 (00264)
SAS100:     0044A (00023) (00241) (00270)
SAS101:     0044C (00024) (00219) (00233) (00242) (00264) (00268) (00271)
SAS27:      003BB (00020) (00224)
SAS50:      003F6 (00021) (00243)
SAS98:      00446 (00022) (00220)
SCLRS:      00001 (00179) (00187)
SINZS:      00600 (00018)
SIZFS:      000FF (00017)
SMULS:      00025 (00108)
START:      07150 (00025) (00042)
SVTS:       003B2 (00019) (00020) (00021) (00022) (00023) (00024)
TABLES:     07150 (00044) (00225)
TABLES2:    0715F (00051) (00234)
WS:         00002 (00026) (00226) (00227) (00228) (00229) (00230) (00231) (00232) (00235) (00236)
WWS:        00004 (00027)
WWHS:       00005 (00028)
WWWS:       00006 (00029)
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```
PAGE   10:      FCH 248... "MPIDCM(Y,U,V)"      MAKHOUL IDCT CORRECTION

  ZS:        00003 (00030)
  ZZMS:      00007 (00031)

LINES WITH ERRORS:    0  (MAP VERSION R00101,10)   E=    0
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```
                  (00001) '  FCB 249... "MPASRT(U)"  SORT DCT1(.) COEFFICIENTS
                  (00002) *                                  ORIGINATED:13-DEC-79
                  (00003) *                                  UPDATED:27-MAY-80
                  (00004) *  DEFINE GLOBAL SYMBOLS
                  (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                  (00006)         OPADD UOF, (3 .LS. 10) + (12 .LS. 5) + $1B
                  (00007)         OPADD WAFNF, (1 .LS. 10) + (12 .LS. 5) + $1A
         00000BEB (00008)         AFDTSORG=$BEB
         0001FFC0 (00009)         APSSMEM=$1FFC0
         000021FC (00010)         CSPUSNOS=$21FC
         00000928 (00011)         DCTS=D'2344'
         00000200 (00012)         DCT1S=D'512'
         00000400 (00013)         DCT2S=D'1024'
         00000928 (00014)         DCTMS=D'2344'
         00000794 (00015)         DMYS=$794
         00000003 (00016)         #M=3
         00000001 (00017)         HS=1
         00000100 (00018)         INCRES=D'256'
         00000000 (00019)         IORDES=D'0'
         00000502 (00020)         ISVTS=$502
         00000502 (00021)         ISAS00=ISVTS+D'0'
         00000503 (00022)         ISAS01=ISVTS+D'1'
         00000000 (00023)         MSS=0
         0000000A (00024)         OVRSLAP=D'10'
         000000FF (00025)         SIZES=D'256'-D'1'
         00000382 (00026)         SVTS=$0382
         00007300 (00027)         START=$7300
         00000C00 (00028)         TABLS0=D'3072'
         00000D00 (00029)         TABLS1=TABLS0+INCRES
         00000E00 (00030)         TABLS2=TABLS1+INCRES
         00000F00 (00031)         TABLS3=TABLS2+INCRES
         00000A00 (00032)         TMP2S=D'2560'
         00000E00 (00033)         TMP3S=D'3584'
         00000C00 (00034)         TMP4S=D'3072'
         00000002 (00035)         WS=2
         00000003 (00036)         ZS=3
                  (00037) *
                  (00038) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
         00000BBE (00039)         #L=AFDTSORG+3*2*(249-128)                    FCB 249
    00BBE 001F7308 (00040)         ADDR SORTS(R7,1)
    00BC0 001F7430 (00041)         ADDR G106S(R7,1)
    00BC2 001021FC (00042)         ADDR CSPUSNOS(,1,0)
                  (00043)         EJECT
```

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                    (00044) *
                    (00045) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00046) *
                    (00047)           BUS 2
          00001E14  (00048)           #L=D'7700'
                    (00049)           EVEN
01E14 3C50          (00050) INSTRS0 DATA INS0*D'512'+X'50',X'0000'
01E15 0000
01E16 3450          (00051) INSTRS1 DATA INS1*D'512'+X'50',X'0000'
01E17 0000
01E18 2C50          (00052) INSTRS2 DATA INS2*D'512'+X'50',X'0000'
01E19 0000
01E1A 2450          (00053) INSTRS3 DATA INS3*D'512'+X'50',X'0000'
01E1B 0000
01E1C 662F          (00054) INSTRS4 DATA INDS4*D'512'+X'2F',X'0000'
01E1D 0000
01E1E 6A2F          (00055) INSTRS5 DATA INDS5*D'512'+X'2F',X'0000'
01E1F 0000
01E20 562E          (00056) INSTRS6 DATA INDS6*D'512'+X'2E',X'0000'
01E21 0000
01E22 5A2E          (00057) INSTRS7 DATA INDS7*D'512'+X'2E',X'0000'
01E23 0000
01E24 0000          (00058) INTGRS   DATA D'0',D'1',D'2',D'3',D'4',D'5',D'6',D'7'
01E25 0001
01E26 0002
01E27 0003
01E28 0004
01E29 0005
01E2A 0006
01E2B 0007
01E2C 0008          (00059)          DATA D'8',D'9',D'10',D'11',D'12',D'13',D'14',D'15'
01E2D 0009
01E2E 000A
01E2F 000B
01E30 000C
01E31 000D
01E32 000E
01E33 000F
01E34 0010          (00060)          DATA D'16',D'17',D'18',D'19',D'20',D'21',D'22',D'23'
01E35 0011
01E36 0012
01E37 0013
01E38 0014
01E39 0015
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01F3A 0016
01F3B 0017
01F3C 0018     (00061)          DATA D'24',D'25',D'26',D'27',D'28',D'29',D'30',D'31'
01F3D 0019
01F3E 001A
01F3F 001B
01F40 001C
01F41 001D
01F42 001E
01F43 001F
01F44 0020     (00062)          DATA D'32',D'33',D'34',D'35',D'36',D'37',D'38',D'39'
01F45 0021
01F46 0022
01F47 0023
01F48 0024
01F49 0025
01F4A 0026
01F4B 0027
01F4C 0028     (00063)          DATA D'40',D'41',D'42',D'43',D'44',D'45',D'46',D'47'
01F4D 0029
01F4E 002A
01F4F 002B
01F50 002C
01F51 002D
01F52 002E
01F53 002F
01F54 0030     (00064)          DATA D'48',D'49',D'50',D'51',D'52',D'53',D'54',D'55'
01F55 0031
01F56 0032
01F57 0033
01F58 0034
01F59 0035
01F5A 0036
01F5B 0037
01F5C 0038     (00065)          DATA D'56',D'57',D'58',D'59',D'60',D'61',D'62',D'63'
01F5D 0039
01F5E 003A
01F5F 003B
01F60 003C
01F61 003D
01F62 003E
01F63 003F
01F64 0040     (00066)          DATA D'64',D'65',D'66',D'67',D'68',D'69',D'70',D'71'
01F65 0041
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01E66 0042
01E67 0043
01E68 0044
01E69 0045
01E6A 0046
01E6B 0047
01E6C 0048      (00067)      DATA D'72',D'73',D'74',D'75',D'76',D'77',D'78',D'79'
01E6D 0049
01E6E 004A
01E6F 004B
01E70 004C
01E71 004D
01E72 004E
01E73 004F
01E74 0050      (00068)      DATA D'80',D'81',D'82',D'83',D'84',D'85',D'86',D'87'
01E75 0051
01E76 0052
01E77 0053
01E78 0054
01E79 0055
01E7A 0056
01E7B 0057
01E7C 0058      (00069)      DATA D'88',D'89',D'90',D'91',D'92',D'93',D'94',D'95'
01E7D 0059
01E7E 005A
01E7F 005B
01E80 005C
01E81 005D
01E82 005E
01E83 005F
01E84 0060      (00070)      DATA D'96',D'97',D'98',D'99',D'100',D'101',D'102',D'103'
01E85 0061
01E86 0062
01E87 0063
01E88 0064
01E89 0065
01E8A 0066
01E8B 0067
01E8C 0068      (00071)      DATA D'104',D'105',D'106',D'107',D'108',D'109',D'110',D'111'
01E8D 0069
01E8E 006A
01E8F 006B
01E90 006C
01E91 006D
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01F92 006E
01F93 006F
01F94 0070        (00072)        DATA D'112',D'113',D'114',D'115',D'116',D'117',D'118',D'119'
01F95 0071
01F96 0072
01F97 0073
01F98 0074
01F99 0075
01F9A 0076
01F9B 0077
01F9C 0078        (00073)        DATA D'120',D'121',D'122',D'123',D'124',D'125',D'126',D'127'
01F9D 0079
01F9E 007A
01F9F 007B
01FA0 007C
01FA1 007D
01FA2 007E
01FA3 007F
01FA4 0080        (00074)        DATA D'128',D'129',D'130',D'131',D'132',D'133',D'134',D'135'
01FA5 0081
01FA6 0082
01FA7 0083
01FA8 0084
01FA9 0085
01FAA 0086
01FAB 0087
01FAC 0088        (00075)        DATA D'136',D'137',D'138',D'139',D'140',D'141',D'142',D'143'
01FAD 0089
01FAE 008A
01FAF 008B
01FB0 008C
01FB1 008D
01FB2 008E
01FB3 008F
01FB4 0090        (00076)        DATA D'144',D'145',D'146',D'147',D'148',D'149',D'150',D'151'
01FB5 0091
01FB6 0092
01FB7 0093
01FB8 0094
01FB9 0095
01FBA 0096
01FBB 0097
01FBC 0098        (00077)        DATA D'152',D'153',D'154',D'155',D'156',D'157',D'158',D'159'
01FBD 0099
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01FBE 009A
01FBF 009B
01FC0 009C
01FC1 009D
01FC2 009E
01FC3 009F
01FC4 00A0      (00078)         DATA D'160',D'161',D'162',D'163',D'164',D'165',D'166',D'167'
01FC5 00A1
01FC6 00A2
01FC7 00A3
01FC8 00A4
01FC9 00A5
01FCA 00A6
01FCB 00A7
01FCC 00A8      (00079)         DATA D'168',D'169',D'170',D'171',D'172',D'173',D'174',D'175'
01FCD 00A9
01FCE 00AA
01FCF 00AB
01FD0 00AC
01FD1 00AD
01FD2 00AE
01FD3 00AF
01FD4 00B0      (00080)         DATA D'176',D'177',D'178',D'179',D'180',D'181',D'182',D'183'
01FD5 00B1
01FD6 00B2
01FD7 00B3
01FD8 00B4
01FD9 00B5
01FDA 00B6
01FDB 00B7
01FDC 00B8      (00081)         DATA D'184',D'185',D'186',D'187',D'188',D'189',D'190',D'191'
01FDD 00B9
01FDE 00BA
01FDF 00BB
01FE0 00BC
01FE1 00BD
01FE2 00BE
01FE3 00BF
01FE4 00C0      (00082)         DATA D'192',D'193',D'194',D'195',D'196',D'197',D'198',D'199'
01FE5 00C1
01FE6 00C2
01FE7 00C3
01FE8 00C4
01FE9 00C5
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01EEA 00C6
01EEB 00C7
01EEC 00C8     (00083)     DATA D'200',D'201',D'202',D'203',D'204',D'205',D'206',D'207'
01EED 00C9
01EEE 00CA
01EEF 00CB
01EF0 00CC
01EF1 00CD
01EF2 00CE
01EF3 00CF
01EF4 00D0     (00084)     DATA D'208',D'209',D'210',D'211',D'212',D'213',D'214',D'215'
01EF5 00D1
01EF6 00D2
01EF7 00D3
01EF8 00D4
01EF9 00D5
01EFA 00D6
01EFB 00D7
01EFC 00D8     (00085)     DATA D'216',D'217',D'218',D'219',D'220',D'221',D'222',D'223'
01EFD 00D9
01EFE 00DA
01EFF 00DB
01F00 00DC
01F01 00DD
01F02 00DE
01F03 00DF
01F04 00E0     (00086)     DATA D'224',D'225',D'226',D'227',D'228',D'229',D'230',D'231'
01F05 00E1
01F06 00E2
01F07 00E3
01F08 00E4
01F09 00E5
01F0A 00E6
01F0B 00E7
01F0C 00E8     (00087)     DATA D'232',D'233',D'234',D'235',D'236',D'237',D'238',D'239'
01F0D 00E9
01F0E 00EA
01F0F 00EB
01F10 00EC
01F11 00ED
01F12 00EE
01F13 00EF
01F14 00F0     (00088)     DATA D'240',D'241',D'242',D'243',D'244',D'245',D'246',D'247'
01F15 00F1
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01F16 00F2
01F17 00F3
01F18 00F4
01F19 00F5
01F1A 00F6
01F1B 00F7
01F1C 00F8     (00089)        DATA D'248',D'249',D'250',D'251',D'252',D'253',D'254',D'255'
01F1D 00F9
01F1E 00FA
01F1F 00FB
01F20 00FC
01F21 00FD
01F22 00FE
01F23 00FF
               (00090)        BUS 1
      00007300 (00091)        #L=START
               (00092) ;T1$     DATA 1F'0.713'
               (00093) ;T2$     DATA 1F'2.5'
               (00094) ;T3$     DATA 1F'7.5'
07300 BE77A2C0 (00095) T1$    DATA 1F'-0.48802602'
07302 0A934F41 (00096) T2$    DATA 1F'1.32192810'
07304 17414FC1 (00097) T3$    DATA 1F'2.9068906'
               (00098)        EJECT
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                           (00099) *
                           (00100) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                           (00101) *
                           (00102)           EVEN
    07306 0000             (00103)           DATA SORTSSA                     START ADDRESS
    07307 0090             (00104)           DATA SORTSSZ                     MODULE SIZE
                           (00105) SORTS     BEGIN APU(SORT)
          00000000         (00106)           #A=0
A00 07308 08F10000         (00107) SORTSSA   MOV(IQA,A1)\NOP                  A1=THRSH1
A01 0730A 20250000         (00108)           CLEAR(G1)\NOP                    RESET STALL FLAG
A02 0730C 000008F5         (00109)           NOP\MOV(IQA,A5)                  A5=THRSH2
A03 0730E 20500000         (00110)           SET(RO)\NOP                      ENABLE OUTPUT ADDRESSING
A04 07310 08F30000         (00111)           MOV(IQA,A3)\NOP                  A3=THRSH3
A05 07312 000008F7         (00112)           NOP\MOV(IQA,A7)                  A7=1
A06 07314 00000810         (00113)           NOP\MOV(ZERO,A0)                 A0=0
A07 07316 00000811         (00114)           NOP\MOV(ZERO,A1)                 A1=0
A08 07318 00000812         (00115)           NOP\MOV(ZERO,A2)                 A2=0
A09 0731A 00000813         (00116)           NOP\MOV(ZERO,A3)                 A3=0
A0A 0731C 08F008F4         (00117)           MOV(IQA,A0)\MOV(IQA,A4)          A0=D=DCT1(I);A4=D
A0B 0731E 49004080         (00118)           SUB(A0,A1)\SUB(A4,A5)            D-THRSH1;D-THRSH2
A0C 07320 08800880         (00119) INCSI     MOV(R,NULL)                      FORCE END
A0D 07322 911E0030         (00120)           JUMPS(LVLS0,T1)                  IF T1=1,LEVEL 0
A0E 07324 911F0026         (00121)           JUMPS(LVLS1,T2)                  IF T2=1,LEVEL 1
A0F 07326 48000000         (00122)           SUB(A0,A3)\NOP                   D-THRSH3
A10 07328 08800000         (00123)           MOV(R,NULL)\NOP                  FORCE END
A11 0732A 911E001C         (00124)           JUMPS(LVLS2,T1)                  IF T1=1,LEVEL 2
A12 0732C 20480000         (00125) LVLS3     SET(AF3)\NOP                     INFORM APS OF LVL3
A13 0732E 20530000         (00126)           SET(UN)\NOP                      FIXED POINT ADD
A14 07330 00004760         (00127)           NOP\ADD(A3,A7)                   LVL3 CNT+1
A15 07332 08F008F4         (00128)           MOV(IQA,A0)\MOV(IQA,A4)          A0=D=DCT1(I+1);A4=D
A16 07334 08FC0893         (00129)           MOV(IQA,OO)\MOV(R,A3)            OO=I;LVL3=LVL3+1
A17 07336 20330000         (00130)           CLEAR(UN)\NOP                    RESUME FLOATING POINT!
A18 07338 49004080         (00131)           SUB(A0,A1)\SUB(A4,A5)            D-THRSH1;D-THRSH2
A19 0733A 910B0019         (00132) #1        JUMPS(#1,AF3)
A1A 0733C 9016000C         (00133)           JUMPC(INCS1,FW1)                 FOR I=0,1,2...LTH-1
A1B 0733E 1045003A         (00134)           JUMP(CNTSOUT,G1),SET             GET LEVEL COUNTS
A1C 07340 204A0000         (00135) LVLS2     SET(AF2)\NOP                     INFORM APS OF LVL2
A1D 07342 20530000         (00136)           SET(UN)\NOP                      FIXED POINT ADD
A1E 07344 00004740         (00137)           NOP\ADD(A2,A7)                   LVL2 CNT+1
A1F 07346 08F008F4         (00138)           MOV(IQA,A0)\MOV(IQA,A4)          A0=D=DCT1(I+1);A4=D
A20 07348 08FC0892         (00139)           MOV(IQA,OO)\MOV(R,A2)            OO=I;LVL2=LVL2+1
A21 0734A 20330000         (00140)           CLEAR(UN)\NOP                    RESUME FLOATING POINT!
A22 0734C 49004080         (00141)           SUB(A0,A1)\SUB(A4,A5)            D-THRSH1;D-THRSH2
A23 0734E 910A0023         (00142) #1        JUMPS(#1,AF2)
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A24 07350 9016000C (00143)          JUMPC(INCS1,FWI)            FOR I=0,1,2...LTH-1
A25 07352 1045003A (00144)          JUMP(CNTSOUT,G1),SET        GET LEVEL COUNTS
A26 07354 20490000 (00145) LVLS1    SET(AF1)\NOP                INFORM APS OF LVL1
A27 07356 20530000 (00146)          SET(UN)\NOP                 FIXED POINT ADD
A28 07358 00004720 (00147)          NOP\ADD(A1,A7)              LVL1 CNT+1
A29 0735A 08F008F4 (00148)          MOV(IQA,A0)\MOV(IQA,A4)     A0=D=DCT1(I+1);A4=D
A2A 0735C 08FC0891 (00149)          MOV(IQA,OQ)\MOV(R,A1)       OQ=I;LVL1=LVL1+1
A2B 0735E 20330000 (00150)          CLEAR(UN)\NOP               RESUME FLOATING POINT!
A2C 07360 49004D80 (00151)          SUB(A0,A1)\SUB(A4,A5)       D-THRSH1;D-THRSH2
A2D 07362 9109002D (00152) #1       JUMPS(#1,AF1)
A2E 07364 9016000C (00153)          JUMPC(INCS1,FWI)            FOR I=0,1,2...LTH-1
A2F 07366 1045003A (00154)          JUMP(CNTSOUT,G1),SET        GET LEVEL COUNTS
A30 07368 20480000 (00155) LVLS0    SET(AF0)\NOP                INFORM APS OF LVL0
A31 0736A 20530000 (00156)          SET(UN)\NOP                 FIXED POINT ADD
A32 0736C 00004700 (00157)          NOP\ADD(A0,A7)              LVL0 CNT+1
A33 0736E 08F008F4 (00158)          MOV(IQA,A0)\MOV(IQA,A4)     A0=D=DCT1(I+1);A4=D
A34 07370 08FC0890 (00159)          MOV(IQA,OQ)\MOV(R,A0)       OQ=I;LVL0=LVL0+1
A35 07372 20330000 (00160)          CLEAR(UN)\NOP               RESUME FLOATING POINT!
A36 07374 49004D80 (00161)          SUB(A0,A1)\SUB(A4,A5)       D-THRSH1;D-THRSH2
A37 07376 91080037 (00162) #1       JUMPS(#1,AF0)
A38 07378 9016000C (00163)          JUMPC(INCS1,FWI)            FOR I=0,1,2...LTH-1
A39 0737A 20450000 (00164)          SET(G1)\NOP                 GET LEVEL COUNTS
A3A 0737C 00000200 (00165) CNTSOUT  NOP\R(A0)                   R=LVL0 CNT
A3B 0737E 0000023C (00166)          NOP\MOV(OQ),R(A1)           R=LVL1 CNT
A3C 07380 0000025C (00167)          NOP\MOV(OQ),R(A2)           R=LVL2 CNT
A3D 07382 0000027C (00168)          NOP\MOV(OQ),R(A3)           R=LVL3 CNT
A3E 07384 0000089C (00169)          NOP\MOV(R,OQ)               OQ=LVL3 CNT(0 UPTO LTH)
A3F 07386 081C081C (00170)          MOV(ZERO,OQ)                OQ=0 FOR INSTRS4+1...
A40 07388 081C081C (00171)          MOV(ZERO,OQ)                THRU INSTRS7+1
A41 0738A 00000000 (00172) #1       NOP                         WAIT FOR...
A42 0738C 901C0041 (00173)          JUMPC(#1,F0)                "LEVELS" TO SETTLE
A43 0738E 20370000 (00174)          CLEAR(WI)\NOP               RELEASE APS INPUT
A44 07390 20500000 (00175)          SET(RO)\NOP                 RELEASE APS OUTPUT
A45 07392 08FC0000 (00176)          MOV(IQA,OQ)\NOP             SCATTER-WRITE INTO INS0
A46 07394 08FC0000 (00177)          MOV(IQA,OQ)\NOP             SCATTER-WRITE INTO INS1
A47 07396 08FC0000 (00178)          MOV(IQA,OQ)\NOP             SCATTER-WRITE INTO INS2
A48 07398 08FC0000 (00179)          MOV(IQA,OQ)\NOP             SCATTER-WRITE INTO INS3
A49 0739A 00000000 (00180) #2       NOP                         WAIT FOR...
A4A 0739C 901C0049 (00181)          JUMPC(#2,F0)                "WRITES" TO SETTLE
A4B 0739E 20370000 (00182)          CLEAR(WI)\NOP               RELEASE APS INPUT
A4C 073A0 20500000 (00183)          SET(RO)\NOP                 RELEASE APS OUTPUT
A4D 073A2 08FC0000 (00184) ORDRS1   MOV(IQA,OQ)\NOP             OQ=IORDR(I)
A4E 073A4 08FC0000 (00185)          MOV(IQA,OQ)\NOP             OQ=IORDR(I+1)
A4F 073A6 08FC0000 (00186)          MOV(IQA,OQ)\NOP             OQ=IORDR(I+2)
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A50 073A8 08FC0000 (00187)         MOV(IOA,OO)\NOP          OO=IORDR(I+3)
A51 073AA 9016004D (00188)         JUMPC(ORDRSI,FWI)        FOR I=0,1,2...LTH-1
A52 073AC 202R0000 (00189)         CLEAR(AFO)\NOP           CLEAR "SKIP" FLG
A53 073AE 081C081C (00190)         MOV(ZERO,OO)             OO=BUFFER ZONE=0
A54 073B0 081C081C (00191)         MOV(ZERO,OO)             OO=BUFFER ZONE=0
A55 073B2 081C081C (00192)         MOV(ZERO,OO)             OO=BUFFER ZONE=0
A56 073B4 081C081C (00193)         MOV(ZERO,OO)             OO=BUFFER ZONE=0
A57 073B6 081C081C (00194)         MOV(ZERO,OO)             OO=BUFFER ZONE=0
                   (00195) *
A58 073B8 20370000 (00196) SHUFLSV CLEAR(WI)\NOP            RELEASE APS INPUT
A59 073BA 20530000 (00197)         SET(UN)\NOP              FIXED POINT ADD
A5A 073BC 08F00000 (00198)         MOV(IOA,A0)\NOP          A0=J
A5B 073BE 000008F0 (00199)         NOP\MOV(IOA,A0)          A0=K
A5C 073C0 40004000 (00200)         ADD(A0,A0)               2J;2K
A5D 073C2 08F10000 (00201)         MOV(IOA,A1)\NOP          A1=J'
A5E 073C4 000008F1 (00202)         NOP\MOV(IOA,A1)          A1=K'
A5F 073C6 413C413C (00203)         MOV(OO),ADD(A1,A1)       2J->S6+1,2J';2K->S7+1,2K
                   (00204) ;                                '
A60 073C8 08FC0000 (00205)         MOV(IOA,OO)\NOP          INSTRS4 INTO INDS4
A61 073CA 000008FC (00206)         NOP\MOV(IOA,OO)          INSTRS5 INTO INDS5
A62 073CC 08FC0000 (00207)         MOV(IOA,OO)\NOP          NULL=TMP2(J*)
A63 073CE 08FC0000 (00208)         MOV(IOA,OO)\NOP          NULL=DCT1(J*)
A64 073D0 08FC0000 (00209)         MOV(IOA,OO)\NOP          NULL=DCTM(J*)
A65 073D2 08FC0000 (00210)         MOV(IOA,OO)\NOP          NULL=TMP2(K*)
A66 073D4 08FC0000 (00211)         MOV(IOA,OO)\NOP          NULL=DCT1(K*)
A67 073D6 08FC0000 (00212)         MOV(IOA,OO)\NOP          NULL=DCTM(K*)
A68 073D8 08F20000 (00213)         MOV(IOA,A2)\NOP          A2=J''
A69 073DA 000008F2 (00214)         NOP\MOV(IOA,A2)          A2=K''
A6A 073DC 425C425C (00215)         MOV(OO),ADD(A2,A2)       2J'->S4+1,2J'';2K'->S5+1
                   (00216) ;                                ,2K''
A6B 073DE 08FC0000 (00217)         MOV(IOA,OO)\NOP          INSTRS6 INTO INDS6
A6C 073E0 000008FC (00218)         NOP\MOV(IOA,OO)          INSTRS7 INTO INDS7
A6D 073E2 08FC0000 (00219)         MOV(IOA,OO)\NOP          NULL=TMP2(J**)
A6E 073E4 08FC0000 (00220)         MOV(IOA,OO)\NOP          NULL=DCT1(J**)
A6F 073E6 08FC0000 (00221)         MOV(IOA,OO)\NOP          NULL=DCTM(J**)
A70 073E8 08FC0000 (00222)         MOV(IOA,OO)\NOP          NULL=TMP2(K**)
A71 073EA 08FC0000 (00223)         MOV(IOA,OO)\NOP          NULL=DCT1(K**)
A72 073EC 08FC0000 (00224)         MOV(IOA,OO)\NOP          NULL=DCTM(K**)
A73 073EE 911D008E (00225) SHUFLS  JUMPS(DNESA,F1)          I/O HAS SETTLED! DONE?
A74 073F0 901C0074 (00226) STALS   JUMPC(STALS,EO)          WAIT FOR OUTPUT TO CLEAR
A75 073F2 204R0000 (00227)         SET(AFO)\NOP             SET OUTPUT "SKIP" FLG
A76 073F4 20500000 (00228)         SET(RO)\NOP              RELEASE APS OUTPUT
A77 073F6 08F10000 (00229)         MOV(IOA,A1)\NOP          A1=J'
A78 073F8 000008F1 (00230)         NOP\MOV(IOA,A1)          A1=K'
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A79 073FA 413C413C (00231)         MOV(00),ADD(A1,A1)      2J->$6+1,2J';2K->$7+1,2K
                   (00232) ;                               '
A7A 073FC 08FC0000 (00233)         MOV(IOA,00)\NOP         INSTRS4 INTO INDS4
A7B 073FE 00000BFC (00234)         NOP\MOV(IOA,00)         INSTRS5 INTO INDS5
A7C 07400 08FC0000 (00235)         MOV(IOA,00)\NOP         DCT2(I)=TMP2(J*)
A7D 07402 08FC0000 (00236)         MOV(IOA,00)\NOP         TMP4(I)=DCT1(J*)
A7E 07404 08FC0000 (00237)         MOV(IOA,00)\NOP         TMP3(I)=DCTM(J*)
A7F 07406 00000BFC (00238)         NOP\MOV(IOA,00)         DCT2(I+1)=TMP2(K*)
A80 07408 00000BFC (00239)         NOP\MOV(IOA,00)         TMP4(I+1)=DCT1(K*)
A81 0740A 00000BFC (00240)         NOP\MOV(IOA,00)         TMP3(I+1)=DCTM(K*)
A82 0740C 08F20000 (00241)         MOV(IOA,A2)\NOP         A2=J''
A83 0740E 00000BF2 (00242)         NOP\MOV(IOA,A2)         A2=K''
A84 07410 425C425C (00243)         MOV(00),ADD(A2,A2)      2J'->$4+1,2J'';2K'->$5+1
                   (00244) ;                               ,2K''
A85 07412 08FC0000 (00245)         MOV(IOA,00)\NOP         INSTRS6 INTO INDS6
A86 07414 00000BFC (00246)         NOP\MOV(IOA,00)         INSTRS7 INTO INDS7
A87 07416 08FC0000 (00247)         MOV(IOA,00)\NOP         DCT2(I+2)=TMP2(J*)
A88 07418 08FC0000 (00248)         MOV(IOA,00)\NOP         TMP4(I+2)=DCT1(J*)
A89 0741A 08FC0000 (00249)         MOV(IOA,00)\NOP         TMP3(I+2)=DCTM(J*)
A8A 0741C 00000BFC (00250)         NOP\MOV(IOA,00)         DCT2(I+3)=TMP2(K*)
A8B 0741E 00000BFC (00251)         NOP\MOV(IOA,00)         TMP4(I+3)=DCT1(K*)
A8C 07420 00000BFC (00252)         NOP\MOV(IOA,00)         TMP3(I+3)=DCTM(K*)
A8D 07422 10000073 (00253)         JUMP(SHUFLS)            "JUMP(...)" SETTLES I/O
                   (00254)
A8E 07424 20320000 (00255) DNESA   CLEAR(RA)\NOP           APU DONE!
A8F 07426 00000000 (00256)         NOP
          00000090 (00257)         SORTSSZ=*A-SORTSSA
    07428          (00258)         END SORTSSZ
                   (00259)         EJECT
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                        (00260) *
                        (00261) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00262) *
                        (00263)          EVEN
     07428 00007530     (00264)          ADDR G106$1                       POINTER TO CONSTRUCTED I
                        (00265) ;                                          NSTRUCTION BLOCK
     0742A 00007432     (00266)          ADDR G106$+2*SCLRS                POINTER TO SCALAR BLOCK
     0742C 0000         (00267)          DATA 0                            NUMBER OF SCALARS
     0742D 0102         (00268)          DATA G106$Z                       MODULE SIZE
     0742F 00007476     (00269)          ADDR G106$A                       POINTER TO CHAIN ANCHOR
                        (00270)          EVEN                              END ON WORD BOUNDARY
                        (00271) *
                        (00272) G106$    BEGIN APS(G106)
 A00 07430 00103940     (00273)          JSN(G106$1,P1)                    SET INPUT PC(P1)
 A01 07432 02C27300     (00274) SCLRS    LOAD(BR0,T1S(1),TF)               IQ=T1
 A02 07434 04C27302     (00275)          LOAD(BR0,T2S(1),TF)               IQ=T2
 A03 07436 06C27304     (00276)          LOAD(BR0,T3S(1),TF)               IQ=T3
 A04 07438 09420503     (00277)          LOAD(BR0,ISAS01(1),TF)            IQ=1
 A05 0743A 0AC60A00     (00278)          LOAD(BR0,TMP2S(3),TF)             IQ=TMP2(0)
 A06 0743C 0C5000FF     (00279)          LOAD(BR1,SIZES)                   TMP2(.) SIZE-1
 A07 0743E 0E641F23     (00280)          LOAD(BR2,INTGRS-1(2))             TABL(.) BA-1
 A08 07440 108A0002     (00281) IINCSI   ADD(BR0,WS,TF)                    IQ=TMP2(I+1)
 A09 07442 132A0001     (00282)          ADD(BR2,HS,TF)                    IQ=TABL(I)=I
 A0A 07444 141908B1     (00283)          SUBL(BR1,1),JUMPP(IINCSI)         FOR I=0,1,2...LTH-1
 A0B 07446 16300037     (00284)          SET(#1)                           STALL APS INPUT
 A0C 07448 18500002     (00285)          LOAD(BR1,2)                       3+1=4 OVERWRITES
 A0D 0744A 1AC41F14     (00286)          LOAD(BR0,INSTRS0(2),TF)           IQ="LOAD(BR1,MSS)"
 A0E 0744C 1C8A0002     (00287) #1       ADD(BR0,WS,TF)                    IQ="LOAD(BR1,MSS)"
 A0F 0744E 1E190EB1     (00288)          SUBL(BR1,1),JUMPP(#1)             INS2,INS1 & INS0
 A10 07450 20300037     (00289)          SET(#1)                           STALL APS INPUT
 A11 07452 22460EFF     (00290) L3SSU    LOAD(BR0,TABLS3-1(3))             TABLE3(.) BA-1
 A12 07454 24500000     (00291) INS3     LOAD(BR1,MSS)                     MSS=LEVEL 3 COUNT
 A13 07456 261915E1     (00292) TSTSL3   SUBL(BR1,1),JUMPN(L2SSU)          PICKUP TILL NO MORE
 A14 07458 29091379     (00293)          ADDL(BR0,HS,TF),JUMP(TSTSL3)      IQ=TABLE3(I)
 A15 0745A 2A4600FF     (00294) L2SSU    LOAD(BR0,TABLS2-1(3))             TABLE2(.) BA-1
 A16 0745C 2C500000     (00295) INS2     LOAD(BR1,MSS)                     MSS=LEVEL 2 COUNT
 A17 0745E 2F1919F1     (00296) TSTSL2   SUBL(BR1,1),JUMPN(L1SSU)          PICKUP TILL NO MORE
 A18 07460 31091779     (00297)          ADDL(BR0,HS,TF),JUMP(TSTSL2)      IQ=TABLE2(I)
 A19 07462 32460CFF     (00298) L1SSU    LOAD(BR0,TABLS1-1(3))             TABLE1(.) BA-1
 A1A 07464 34500000     (00299) INS1     LOAD(BR1,MSS)                     MSS=LEVEL 1 COUNT
 A1B 07466 361910F1     (00300) TSTSL1   SUBL(BR1,1),JUMPN(L0SSU)          PICKUP TILL NO MORE
 A1C 07468 39091B79     (00301)          ADDL(BR0,HS,TF),JUMP(TSTSL1)      IQ=TABLE1(I)
 A1D 0746A 3A460BFF     (00302) L0SSU    LOAD(BR0,TABLS0-1(3))             TABLE0(.) BA-1
 A1E 0746C 3C500000     (00303) INS0     LOAD(BR1,MSS)                     MSS=LEVEL 0 COUNT
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A1F 0746F 3F1921F1 (00304) TSTSLO  SUBL(BR1,1),JUMPN(STALSI)          PICKUP TILL NO MORE
A20 07470 41091F79 (00305)         ADDL(BR0,HS,TF),JUMP(TSTSLO)       IO=TABLEO(I)
A21 07472 42300037 (00306) STALSI  SET(WI)                            STALL APS INPUT
A22 07474 44500103 (00307)         LOAD(BR1,SIZES+4)                  IORDR(.) SIZE-1+4
                   (00308) *
A23 07476 47400000 (00309)         LOAD(BR0,IOI,TF)                   IORDR(.) .A,IO=IORDR=J
A24 07478 48600000 (00310)         LOAD(BR2,MSS)                      DUMMY OP FOR EXEC
A25 0747A 48DA0000 (00311)         ADD(BR0,MSS,TF)                    IO=IORDR(I)=K
A26 0747C 4D0A0001 (00312) INDSJ   ADD(BR0,HS,TF)                     IO=J'=IORDR(I+2)
A27 0747E 4F0A0001 (00313)         ADD(BR0,HS,TF)                     IO=K'=IORDR(I+3)
A28 07480 50F41F1C (00314)         LOAD(BR2,INSTRS4(2),TF)            OVERWRITE INDS4
A29 07482 52F41F1F (00315)         LOAD(BR2,INSTRS5(2),TF)            OVERWRITE INDS5
A2A 07484 54600000 (00316)         LOAD(BR2,MSS)                      RESET BR2 TO 0!
A2B 07486 562F0000 (00317) INDS6   ADD(BR2,MSS,NA,C)                  MSS=2J,PC->PC1
A2C 07488 58600000 (00318)         LOAD(BR2,MSS)                      RESET BR2 TO 0!
A2D 0748A 5A2F0000 (00319) I' S7   ADD(BR2,MSS,NA,C)                  MSS=2J,PC->PC1
A2E 0748C 5D0A0001 (00320)         ADD(BR0,HS,TF)                     IO=J''
A2F 0748E 5F0A0001 (00321)         ADD(BR0,HS,TF)                     IO=K''
A30 07490 60E41F20 (00322)         LOAD(BR2,INSTRS6(2),TF)            OVERWRITE INDS6
A31 07492 62F41F22 (00323)         LOAD(BR2,INSTRS7(2),TF)            OVERWRITE INDS7
A32 07494 64600000 (00324)         LOAD(BR2,MSS)                      RESET BR2 TO 0!
A33 07496 662F0000 (00325) INDS4   ADD(BR2,MSS,NA,C)                  MSS=2J,PC->PC1
A34 07498 68600000 (00326)         LOAD(BR2,MSS)                      RESET BR2 TO 0!
A35 0749A 6A2F0000 (00327) INDS5   ADD(BR2,MSS,NA,C)                  MSS=2J,PC->PC1
A36 0749C 6C1926B4 (00328)         SUBL(BR1,4),JUMPP(INDSJ)           FOR I=0,1,2...LTH+1
                   (00329) *
A37 0749E 6E200031 (00330) DNESI   CLEAR(RI)                          INPUT DONE!
A38 074A0 70000020 (00331)         NOP
A39 074A2 72204240 (00332) G106S1  JSN(G106S0,P2)                     SET OUTPUT PC
A3A 074A4 74760A00 (00333) TOPSP1  LOAD(BR3,TMP2S(3))                 TMP2(.) BA
A3B 074A6 76B9002D (00334)         ADDB(BR3,BR2,TF)                   IO=TMP2(J* OR K*)
A3C 074A8 78740928 (00335)         LOAD(BR3,DCTMS(2))                 DCTM(.) BA
A3D 074AA 7AB9002D (00336)         ADDB(BR3,BR2,TF)                   IO=DCTM(J* OR K*)
A3E 074AC 7C760200 (00337)         LOAD(BR3,DCT1S(3))                 DCT1(.) BA
A3F 074AE 7EB9002D (00338)         ADDB(BR3,BR2,TF)                   IO=DCT1(J* OR K*)
A40 074B0 802F0000 (00339)         ADD(BR2,MSS,NA,C)                  PC->PC0
A41 074B2 82003A60 (00340)         JUMP(TOPSP1)                       RESET PC AND SETTLE
                   (00341) *
A42 074B4 84307040 (00342) G106S0  JSN(G106S3,P3)                     SET OUTPUT PC(PC3)
A43 074B6 86460BFF (00343)         LOAD(BW0,TABLS0-1(3))              TABLEO(.) BA-1
A44 074B8 88560CFF (00344)         LOAD(BW1,TABLS1-1(3))              TABLE1(.) BA-1
A45 074BA 8A660DFF (00345)         LOAD(BW2,TABLS2-1(3))              TABLE2(.) BA-1
A46 074BC 8C760EFF (00346)         LOAD(BW3,TABLS3-1(3))              TABLE3(.) BA-1
A47 074BE 8E0055F5 (00347) FLGSTST JUMPS(SETSCNT,G1)                  G1=1,SET LEVEL COUNTS
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A48 074C0 90004DFB (00348)         JUMPS(INSRTS0,AF0)                 AF0=1 THEN LEVEL 0
A49 074C2 92004FF9 (00349)         JUMPS(INSRTS1,AF1)                 AF1=1 THEN LEVEL 1
A4A 074C4 940051FA (00350)         JUMPS(INSRTS2,AF2)                 AF2=1 THEN LEVEL 2
A4B 074C6 960053FB (00351)         JUMPS(INSRTS3,AF3)                 AF3=1 THEN LEVEL 3
A4C 074C8 98004760 (00352)         JUMP(FLGSTST)                      RE-TEST ALL FLAGS
A4D 074CA 9A20002B (00353) INSRTS0 CLEAR(AF0)                         RELEASE APU
A4E 074CC 9D014779 (00354)         ADDL(BW0,HS,TE),JUMP(FLGSTST)      OQ=TABLE0(II),II=II+1
A4F 074CE 9E200029 (00355) INSRTS1 CLEAR(AF1)                         RELEASE APU
A50 074D0 A1114779 (00356)         ADDL(BW1,HS,TE),JUMP(FLGSTST)      OQ=TABLE1(JJ),JJ=JJ+1
A51 074D2 A220002A (00357) INSRTS2 CLEAR(AF2)                         RELEASE APU
A52 074D4 A5214779 (00358)         ADDL(BW2,HS,TE),JUMP(FLGSTST)      OQ=TABLE2(KK),KK=KK+1
A53 074D6 A620002B (00359) INSRTS3 CLEAR(AF3)                         RELEASE APU
A54 074D8 A9314779 (00360)         ADDL(BW3,HS,TE),JUMP(FLGSTST)      OQ=TABLE3(LL),LL=LL+1
A55 074DA AA500007 (00361) SETSCNT LOAD(BW1,7)                        8 "INSTR" WORDS...
A56 074DC AC441F13 (00362)         LOAD(BW0,INSTRS0-1(2))             TO BE SET OR CLEARED
A57 074DE AE0A0002 (00363) #1      ADD(BW0,WS,TE)                     OQ=INSTRS#+1
A58 074E0 B01157B1 (00364)         SUBL(BW1,1),JUMPP(#1)              FOR I=0,1,2...7
A59 074E2 B2200030 (00365)         CLEAR(RO)                          STALL APS OUTPUT
A5A 074E4 B4500003 (00366)         LOAD(BW1,3)                        3+1=4 SCATTER WRITES
A5B 074E6 B6C3FFC0 (00367) #2      LOAD(BW0,APSSMEM(1),TE)            INSTRS# OVERWRITE
A5C 074E8 B8115BB1 (00368)         SUBL(BW1,1),JUMPP(#2)              FOR I=0,1...3
A5D 074EA BA200030 (00369)         CLEAR(RO)                          STALL APS OUTPUT
A5E 074EC BC000020 (00370)         NOP                                RELEASED BY APU
A5F 074EE BE460000 (00371)         LOAD(BW0,IORDRS(3),TE)             IORDR(.) BA,OQ=IORDR(0)
A60 074F0 C0500108 (00372)         LOAD(BW1,SIZES+OVRSLAP-1)          IORDR(.) SIZE-2+OVERLAP
A61 074F2 C30A0001 (00373) RDSOUT  ADD(BW0,HS,TE)                     OQ=IORDR(I)
A62 074F4 C41161B1 (00374)         SUBL(BW1,1),JUMPP(RDSOUT)          FOR I=1,2...LTH-1;+10 0'
                   (00375) ;                                          S
                   (00376) *
A63 074F6 C64603FE (00377)         LOAD(BW0,DCT2S-2(3))               DCT2(.) BA-2
A64 074F8 C8560DFF (00378)         LOAD(BW1,TMP3S-2(3))               TMP3(.) BA-2
A65 074FA CA760BFE (00379)         LOAD(BW3,TMP4S-2(3))               TMP4(.) BA-2
A66 074FC CC000020 (00380) INDST   NOP                                LET "JUMP(...)" SETTLE
A67 074FE CE641F21 (00381)         LOAD(BW2,INSTRS6+1(2),TE)          SET MSS IN INSTRS6
A68 07500 D1641F23 (00382)         LOAD(BW2,INSTRS7+1(2),TE)          SET MSS IN INSTRS7
A69 07502 D2E3FFC0 (00383)         LOAD(BW2,APSSMEM(1),TE)            OVERWRITE INDS4
A6A 07504 D4AE0000 (00384)         ADD(BW2,MSS,TE,C)                  OVERWRITE INDS5;PC3->PC
A6B 07506 D7641F1D (00385)         LOAD(BW2,INSTRS4+1(2),TE)          SET MSS IN INSTRS4
A6C 07508 D9641F1F (00386)         LOAD(BW2,INSTRS5+1(2),TE)          SET MSS IN INSTRS5
A6D 0750A DAE3FFC0 (00387)         LOAD(BW2,APSSMEM(1),TE)            OVERWRITE INDS6
A6E 0750C DCAE0000 (00388)         ADD(BW2,MSS,TE,C)                  OVERWRITE INDS7;PC3->PC
A6F 0750E DF206670 (00389)         JUMP(INDST,RO),CLEAR               RESET & STALL
A70 07510 F0300032 (00390) G106S3  SET(RA)                            ENABLE APU
A71 07512 F2007AAB (00391) TOPSP3  JUMPC(DMYSFIL,AF0)                 WAIT FOR "SKIP" FLAG
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A72 07514 F4BA0002 (00392)         ADD(BW0,WS,TF)                 00=DCT2(J*)
A73 07516 F69A0002 (00393)         ADD(BW1,WS,TF)                 00=TMP3(J*)=DCTT(J*)
A74 07518 F8BA0002 (00394)         ADD(BW3,WS,TF)                 00=TMP4(J*)=DCT1T(J*)
A75 0751A FABA0002 (00395)         ADD(BW0,WS,TF)                 00=DCT2(K*)
A76 0751C FC9A0002 (00396)         ADD(BW1,WS,TF)                 00=TMP3(K*)=DCTT(K*)
A77 0751E FEBA0002 (00397)         ADD(BW3,WS,TF)                 00=TMP4(K*)=DCT1T(K*)
A78 07520 F02F0000 (00398) CHNGSPC ADD(BW2,MSS,C)                 NO IO! CHANGE PC
A79 07522 F2007160 (00399)         JUMP(TOPSP3)                   RESET PC AND SETTLE
A7A 07524 F4F20794 (00400) DMYSFIL LOAD(BW2,DMYS(1),TF)           00=?
A7B 07526 F6AA0000 (00401)         ADD(BW2,MSS,TF)                00=?
A7C 07528 F8AA0000 (00402)         ADD(BW2,MSS,TF)                00=?
A7D 0752A FAAA0000 (00403)         ADD(BW2,MSS,TF)                00=?
A7E 0752C FCAA0000 (00404)         ADD(BW2,MSS,TF)                00=?
A7F 0752E FEA17878 (00405)         ADDL(BW2,MSS,TF),JUMP(CHNGSPC) 00=? THEN CHANGE PC
                   (00406) *
          00007476 (00407)         G106SA= *C                     ASSIGN VALUE TO CHAIN AN
                   (00408) ;                                      CHOR
    07530          (00409)         END *A-1
                   (00410) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    07530 00000000 (00411) G106SI  DATA 1F'0,0'
          00000102 (00412)         G106SZ=*L-G106S
    07532          (00413)         END
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AFDTSORG:   008E8 (00008) (00039)
APSSMEM:    1FFC0 (00009) (00367) (00383) (00387)
CHNGSPC:    00078 (00398) (00405)
CNTSOUT:    0003A (00134) (00144) (00154) (00165)
CSPUSNOS:   021FC (00010) (00042)
DCTS:       00928 (00011)
DCT1S:      00200 (00012) (00337)
DCT2S:      00400 (00013) (00377)
DCTMS:      00928 (00014) (00335)
DMYS:       00794 (00015) (00400)
DMYSFIL:    0007A (00391) (00400)
DNFSA:      0008F (00225) (00255)
DNFSI:      00037 (00330)
FLGSTST:    00047 (00347) (00352) (00354) (00356) (00358) (00360)
G106S:      07430 (00041) (00266) (00272) (00412)
G106S1:     00039 (00273) (00332)
G106S3:     00070 (00342) (00390)
G106SA:     07476 (00269) (00407)
G106SI:     07530 (00264) (00411)
G106S0:     00042 (00332) (00342)
G106SZ:     00102 (00266) (00412)
HS:         00001 (00017) (00282) (00293) (00297) (00301) (00305) (00312) (00313) (00320) (00321)
                  (00354) (00356) (00358) (00360) (00373)
IINCSI:     00008 (00281) (00283)
INS0:       0001E (00050) (00303)
INS1:       0001A (00051) (00299)
INS2:       00016 (00052) (00295)
INS3:       00012 (00053) (00291)
INCSI:      0000C (00119) (00133) (00143) (00153) (00163)
INCRES:     00100 (00018) (00029) (00030) (00031)
INDS4:      00033 (00054) (00325)
INDS5:      00035 (00055) (00327)
INDS6:      00028 (00056) (00317)
INDS7:      0002D (00057) (00319)
INDSI:      00066 (00380) (00389)
INDSJ:      00026 (00312) (00328)
INSRTS0:    0004D (00348) (00353)
INSRTS1:    0004F (00349) (00355)
INSRTS2:    00051 (00350) (00357)
INSRTS3:    00053 (00351) (00359)
INSTRS0:    01F14 (00050) (00286) (00362)
INSTRS1:    01F16 (00051)
INSTRS2:    01F18 (00052)
INSTRS3:    01F1A (00053)
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INSTRS4:   01E1C (00054) (00314) (00385)
INSTRS5:   01E1E (00055) (00315) (00386)
INSTRS6:   01E20 (00056) (00322) (00381)
INSTRS7:   01E22 (00057) (00323) (00382)
INTGRS:    01E24 (00058) (00280)
IORDRS:    00000 (00019) (00371)
ISAS00:    00502 (00021)
ISAS01:    00503 (00022) (00277)
ISVTS:     00502 (00020) (00021) (00022)
L0SSU:     0001D (00300) (00302)
L1SSU:     00019 (00296) (00298)
L2SSU:     00015 (00292) (00294)
L3SSU:     00011 (00290)
LVLS0:     00030 (00120) (00155)
LVLS1:     00026 (00121) (00145)
LVLS2:     0001C (00124) (00135)
LVLS3:     00012 (00125)
MSS:       00000 (00023) (00291) (00295) (00299) (00303) (00310) (00311) (00316) (00317) (00318)
                 (00319) (00324) (00325) (00326) (00327) (00339) (00384) (00388) (00398) (00401)
                 (00402) (00403) (00404) (00405)
ORDRSI:    0004D (00184) (00188)
OVRSLAP:   0000A (00024) (00372)
RDSOUT:    00061 (00373) (00374)
SCLRS:     00001 (00266) (00274)
SETSCNT:   00055 (00347) (00361)
SHUFLS:    00073 (00225) (00253)
SHUFLSV:   00058 (00196)
SIZES:     000FF (00025) (00279) (00307) (00372)
SORTS:     07308 (00040) (00105)
SORTSSA:   00000 (00103) (00107) (00257)
SORTSSZ:   00090 (00104) (00257) (00258)
STALS:     00074 (00226) (00226)
STALSI:    00021 (00304) (00306)
START:     07300 (00027) (00091)
SVTS:      00382 (00026)
T1S:       07300 (00095) (00274)
T2S:       07302 (00096) (00275)
T3S:       07304 (00097) (00276)
TABLS0:    00C00 (00028) (00029) (00302) (00343)
TABLS1:    00D00 (00029) (00030) (00298) (00344)
TABLS2:    00E00 (00030) (00031) (00294) (00345)
TABLS3:    00F00 (00031) (00290) (00346)
TMP2S:     00A00 (00032) (00278) (00333)
TMP3S:     00F00 (00033) (00378)
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PAGE   19:      FCR 249... "MPASRT(U)"  SORT DCT1(.) COEFFICIENTS

  TMP4S:      00C00 (00034) (00379)
  TOPSP1:     0003A (00333) (00340)
  TOPSP3:     00071 (00391) (00399)
  TSTSL0:     0001F (00304) (00305)
  TSTSL1:     0001A (00300) (00301)
  TSTSL2:     00017 (00296) (00297)
  TSTSL3:     00013 (00292) (00293)
  *S:         00002 (00035) (00281) (00287) (00363) (00392) (00393) (00394) (00395) (00396) (00397)
  ZS:         00003 (00036)

LINES WITH ERRORS:    0  (MAP VERSION R00101.10)   F=    0
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                    (00001) '  FCB 250... "MPESTO(Y,U,V,W))"   QUANTIZE DCT PARAMETERS
                    (00002) *                                  ORIGINATED:25-JUL-79
                    (00003) *                                  UPDATED:29-MAY-80
                    (00004) *  DEFINE GLOBAL SYMBOLS
                    (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                    (00006)         OPADD OUF, (3 .LS. 10) + (12 .LS. 5) + $1B
                    (00007)         OPADD WAFNE, (1 .LS. 10) + (12 .LS. 5) + $1A
                    (00008)         OPADD EO, (3 .LS. 10) + (12 .LS. 5) + $1C
          000008E8 (00009)         AFDTSORG=$8E8
          0001FFC0 (00010)         APSSMEM=$1FFC0
          000021FC (00011)         CSPUSNOS=$21FC
          00000794 (00012)         DMYS=$0794
          00000003 (00013)         #M=3
          00000001 (00014)         HS=1
          00000000 (00015)         MS=0
          00000000 (00016)         MSS=0
          00000502 (00017)         ISVTS=$502
          00000503 (00018)         ISAS001=ISVTS+D'1'
          000003B2 (00019)         SVTS=$03B2
          00000398 (00020)         SAS11=SVTS+2*D'11'
          000003CE (00021)         SAS38=SVTS+2*D'38'
          000003D0 (00022)         SAS39=SVTS+2*D'39'
          00007600 (00023)         START=$7600
          00000E00 (00024)         TMP3S=D'3584'
          00000C00 (00025)         TMP4S=D'3072'
          00000002 (00026)         WS=2
          00000003 (00027)         ZS=3
                    (00028) *
                    (00029) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
          00000BC4 (00030)         #L=AFDTSORG+3*2*(250-128)                    FCB 250
00BC4 001E7602 (00031)         ADDR QUANS(R7,1)
00BC6 001E76AE (00032)         ADDR G104S(R7,1)
00BC8 001021FC (00033)         ADDR CSPUSNOS(,1,0)
                    (00034)         EJECT
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                    (00035) *
                    (00036) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00037) *
                    (00038)              EVEN
                    (00039)              BUS 2
          00001C84 (00040)              *L=D'7300'
01C84 1E50         (00041) INSTRS0 DATA INS0*D'512'+X'50',X'0000'
01C85 0000
                    (00042)              EVEN
01C86 00000000 (00043) NLS0     DATA 1E'0.0'
01C88 08000041 (00044) NLS1     DATA 1E'1.0'
01C8A 10000041 (00045) NLS2     DATA 1E'2.0'
01C8C 20000041 (00046) NLS3     DATA 1E'4.0'
01C8E 40000041 (00047) NLS4     DATA 1E'8.0'
01C90 08000042 (00048) NLS5     DATA 1E'16.0'
                    (00049) *  0,1 LEVEL
01C92 12A05E49 (00050) DTHRS01 DATA 16E'1.0E10'
 ...
                    (00051) *  2 LEVEL
01CB2 0903E441 (00052) DTHRS2  DATA 1E'1.1269',15E'1.0E10'
01CB4 12A05E49
 ...
                    (00053) *  3 LEVEL
01CD2 443EE5C0 (00054) DTHRS3  DATA 1E'0.5332',1E'1.2527',1E'2.3796',13E'1.0E10'
01CD4 0A0587C1
01CD6 13096BC1
01CD8 12A05E49
 ...
                    (00055) *  4 LEVEL
01CF2 21D7DBC0 (00056) DTHRS4  DATA 1E'0.2644',1E'0.5667',1E'0.9198',1E'1.3444'
01CF4 4889A040
01CF6 758C01C0
01CF8 0AC154C1
01CFA 0E055341 (00057)          DATA 1E'1.8776',1E'2.5971',1E'3.724',9E'1.0E10'
01CFC 14C6DC41
01CFE 1DCAC0C1
01D00 12A05E49
 ...
                    (00058) *  5 LEVEL
01D12 10EBEDC0 (00059) DTHRS5  DATA 1E'0.1322',1E'0.2732',1E'0.4243',1E'0.5870'
01D14 22E837C0
01D16 364E7640
01D18 4822D0C0
01D1A 61B089C0 (00060)          DATA 1E'0.7632',1E'0.9555',1E'1.1669',1E'1.4019'
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01D1C 7A40D2C0
01D1E 0955CFC1
01D20 0B371741
01D22 00549541 (00061)        DATA 1F'1.6663',1F'1.9687',1F'2.3217',1F'2.7463'
01D24 0FBFF5C1
01D26 12920741
01D28 15FB6C41
01D2A 1A3C6A41 (00062)        DATA 1F'3.2795',1F'3.9990',1F'5.1259',1.0E10
01D2C 1FF0F3C1
01D2E 2901D7C1
01D30 12A05F49
               (00063)        BUS 1
      00007600 (00064)        #L=START
               (00065)        EVEN
               (00066)        EJECT
```

```
                         *
                         *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                         *
                                  EVEN
    07600 00                      DATA QUANSSA                                     START ADDRESS
    07601 00                      DATA QUANSSZ                                     MODULE SIZE
                         QUANS    BEGIN APU(QUAN)
          00  0000                *A=0
A00 07602 08  0000       QUANSSA  MOV(IOA,A1)\NOP                                  FOR BITS=0 TEST
A01 07604 0A200000                NEG(A1)\NOP                                      WANT A1=8001 NOT FFFF!
A02 07606 16811681                MOV(A1),K(2.0)                                   A1=-1,2.0
A03 07608 08920892                MOV(R,A2)                                        A2=2.0,LE & LO INCRE.
A04 0760A 088F088F                MOV(R,M7)                                        M7=2.0,FORCE Q(K-1)<0
A05 0760C 08D00000       INCSJ    MOV(IO,A0)\NOP                                   A0=IBIT(I)=BITS
A06 0760E 40200000                AD (A1,A0)\NOP                                   IF BITS=0, THEN ZERO FIL
                         ;                                                         L!
A07 07610 08FC0000                MOV(IOA,OO)\NOP                                  OTHERWISE GO W/ SCATTER-
                         ;                                                         WRITES
A08 07612 08800000                MOV(R,NULL)\NOP                                  SAVE TIME BY NOT QUANTIZ
                         ;                                                         ING
A09 07614 901F0012                JUMPC(BITSOK,T1)                                 T1=0 THEN BITS.NE.0
A0A 07616 20490000       ZEROS    SET(AF1)\NOP                                     BITS=0 SO 0 FILL TMP1S
A0B 07618 901C0008       #1       JUMPC(#1,F0)                                     WAIT FOR LAST PUTDOWN
A0C 0761A 20500000                SET(R0)\NOP                                      RELEASE APS OUTPUT
A0D 0761C 081C0000       CLRS     MOV(ZERO,OO)\NOP                                 AND ZERO FILL REMAINDER
A0E 0761E 00000000                NOP                                              *** NOP FOR RACE
A0F 07620 00000000                NOP                                              *** PREVENTION
A10 07622 901C000D                JUMPC(CLRS,F0)                                   BEFORE "IFIX" OF RESULTS
A11 07624 10500043                JUMP(FIXSO,R0),SET                               BITS=0 QUANT. IS USELESS
A12 07626 901C0012       BITSOK   JUMPC(BITSOK,F0)                                 CLEAR BITS PUTDOWN
A13 07628 20370000                CLEAR(WI)\NOP                                    RELEASE APS INPUT
A14 0762A 20500000                SET(R0)\NOP                                      RELEASE APS OUTPUT
A15 0762C 08FC0000                MOV(IOA,OO)\NOP                                  INSO SCATTER-WRITE
A16 0762E 901C0016       #2       JUMPC(#2,F0)                                     1 PUTDOWNS
A17 07630 20370000                CLEAR(WI)\NOP                                    RELEASE APS INPUT
A18 07632 20500000                SET(R0)\NOP                                      RELEASE APS OUTPUT
A19 07634 06A006A0                K(-2.0)\K(-1.0)                                  -2.0;-1.0
A1A 07636 088A088A                MOV(R,M2)                                        M2<0 BOTH SIDES
A1B 07638 08F008F0                MOV(IOA,A0)                                      DCT(J)
A1C 0763A 12131213                MOV(A3),ABS(A0)                                  LE''=-2.0,/DCT(J)/;LO''=
                         ;                                                         -1.0,/DCT(J)/
A1D 0763C 08F608F6                MOV(IOA,A6)                                      A6=NL(1,2,4,8,16)
A1E 0763E 08900890                MOV(R,A0)                                        A0=/DCT(J)/
A1F 07640 911F0022                JUMPS(DCTSN,T1)                                  IF T1=1 DCT(J).LT.0
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A20 07642 02600260 (00111)          R(A3)                       R=LE'';R=LO''
A21 07644 10000023 (00112)          JUMP(CLRSFLG)               RESET "FLAG JAMS"
A22 07646 43C043C0 (00113) DCTSN    ADD(A6,A3)                  LE''+NL;LO''+NL
A23 07648 85605560 (00114) CLRSFLG  MUL(M2,M7)                  P<0 FORCING T-BIT->0 FOR
A24 0764A 08E808E8 (00115)          MOV(IOA,M0)                 DCT1(J)
A25 0764C 08EC0000 (00116)          MOV(IOA,M4)\NOP             D(K)
A26 0764E 000008EC (00117)          NOP\MOV(IOA,M4)             D(K+1)
A27 07650 84148414 (00118) LOOPS    MOV(A4),MUL(M0,M4)          A4=Q(K-2),Q(K);A4=Q(K-1)
                   (00119) ;                                    ,Q(K+1)
A28 07652 4C134 13 (00120)          MOV(A3),SUB(A0,A4)          LE'=LE''+2,T(K-2);LO'=LO
                   (00121) ;                                    ''+2,T(K-1)
A29 07654 08ED0000 (00122)          MOV(IOA,M5)\NOP             D(K+2)
A2A 07656 000008ED (00123)          NOP\MOV(IOA,M5)             D(K+3)
A2B 07658 08800880 (00124)          MOV(R,NULL)                 FORCE COMPLETION
A2C 0765A 911F0039 (00125)          JUMPS(T3S,T1)               IS T1=1 ON T(K-4)?
A2D 0765C 911F003E (00126)          JUMPS(T4S,T2)               IS T2=1 ON T(K-3)?
A2E 0765E 43404340 (00127)          ADD(A2,A3)                  LE'+2;LO'+2
A2F 07660 20370000 (00128)          CLEAR(WI)\NOP               RELEASE APS INPUT
A30 07662 84358435 (00129)          MOV(A5),MUL(M0,M5)          A5=Q(K),Q(K+2);A5=Q(K+1)
                   (00130) ;                                    ,Q(K+3)
A31 07664 40134013 (00131)          MOV(A3),SUB(A0,A5)          LE''=LE'+2,T(K);LO''=LO'
                   (00132) ;                                    +2,T(K+1)
A32 07666 08EC0000 (00133)          MOV(IOA,M4)\NOP             D(K+4)
A33 07668 000008EC (00134)          NOP\MOV(IOA,M4)             D(K+5)
A34 0766A 08800880 (00135)          MOV(R,NULL)                 FORCE COMPLETION
A35 0766C 911F0039 (00136)          JUMPS(T3S,T1)               IS T1=1 ON T(K-4)?
A36 0766E 911F003E (00137)          JUMPS(T4S,T2)               IS T2=1 ON T(K-3)?
A37 07670 43404340 (00138)          ADD(A2,A3)                  LE''+2;LO''+2
A38 07672 10370027 (00139)          JUMP(LOOPS,WI),CLEAR        K=K+4 FOR K<LTH
A39 07674 02600000 (00140) T3S      R(A3)\NOP                   LE
A3A 07676 20480000 (00141)          SET(AF0)\NOP                INFORM APS
A3B 07678 089C0000 (00142)          MOV(R,O0)\NOP               O0=LE
A3C 0767A 91080043 (00143)          JUMPS(FIXSQ,AF3)            "FIX" ALL V VALUES @ ONC
                   (00144) ;                                    E
A3D 0767C 10370005 (00145)          JUMP(INCSJ,WI),CLEAR        FOR I=01,2...LTH-1
A3E 0767E 00000260 (00146) T4S      NOP\R(A3)                   LO
A3F 07680 20480000 (00147)          SET(AF0)\NOP                INFORM APS
A40 07682 0000089C (00148)          NOP\MOV(R,O0)               O0=LO
A41 07684 91080043 (00149)          JUMPS(FIXSQ,AF3)            "FIX" ALL V VALUES @ ONC
                   (00150) ;                                    E
A42 07686 10370005 (00151)          JUMP(INCSJ,WI),CLEAR        FOR I=01,2...LTH-1
                   (00152) *
A43 07688 20370000 (00153) FIXSQ    CLEAR(WI)\NOP               RELEASE APS INPUT
A44 0768A 08EF08EF (00154)          MOV(IOA,M7)                 M7=SCALAR A
```

```
          ... "MCESTO(Y,U,V,W))"   QUANTIZE DCT PARAMETERS

                     (00155)         MOV(IQA,A7)                    A7=SCALAR B
                     (00156) #1      MOV(NULL),ADDST(A0,A7)         R''=P'+(-1) T*B
                     (00157)         MOV(P,NULL)                    COMPLETE MULT.
                     (00158)         MOV(IQA,M0)\NOP                M0=UF
                     (00159)         MOV(A1),ALIGN(A1)              A1=R'',R''=FIXED(=Y'')
                     (00160)         NOP\MOV(IQA,M0)                M0=U0
     07698 84708470  (00161)         MOV(A0),MUL(M0,M7)             A0=P',P=SA*U
     0769A 021C021C  (00162)         MOV(DQ),R(A0)                  OUT=Y'',R=P'
     0769C 901C0046  (00163)         JUMPC(#1,F0)                   FOR I=0,1,2...LTH-1
                     (00164) *
448  0769E 20260000  (00165) DNESA   CLEAR(C2)\NOP                  END ANALYZER TIMING
449  076A0 20320000  (00166)         CLEAR(RA)\NOP                  APU DONE!
450  076A2 00000000  (00167)         NOP
451  076A4 10000000  (00168)         JUMP(0)
           00000052  (00169)         QUAN$SZ=*A-QUAN$SA
     076A6           (00170)         END QUAN$SZ
                     (00171)         EJECT
```

```
                              *
                              *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                              *
                                       EVEN
    076A6  00007776                    ADDR G104S1                  POINTER TO CONSTRUCTED I
                              :                                     NSTRUCTION BLOCK
    076A8  0000772A                    ADDR G104S+2*SCLRS           POINTER TO SCALAR BLOCK
    076AA  0000                        DATA 0                       NUMBER OF SCALARS
    076AB  0000                        DATA G104SZ                  MODULE SIZE
    076AC  00007760                    ADDR G104SA                  POINTER TO CHAIN ANCHOR
                                       EVEN                         END ON WORD BOUNDARY
                              *
                              G104S    BEGIN APS(G104)
A00 076AF  0204840                     JSN(G104S0,P2)               SET OUTPUT PC(P2)
A01 076B0  02300030                    SET(R0)                      ENABLE APS OUTPUT
A02 076B2  05420503                    LOAD(BR0,ISAS001(1),TF)      IQ=1
A03 076B4  06701000                    LOAD(BR3,I1))                IBIT(.) BA
A04 076B6  08500000                    LOAD(BR1,MSS)                DUMMY OP FOR EXEC
A05 076B8  0A320000                    SUB(BR3,MSS)                 IBIT(.) BA-1
A06 076BA  0C460BFF                    LOAD(BR0,TMP3S-2(3))         TMP3(.)->DCTT(.) BA-2
A07 076BC  0F660BFF                    LOAD(BR2,TMP4S-2(3))         TMP4(.)->DCT1T(.) BA-2
A08 076BF  113A0001           IINCS1   ADD(BR3,HS,TF)               IQ=IBIT(I)
A09 076C0  12300037                    SET(WI)                      LET APS OUTPUT CATCH-UP
A0A 076C2  14200028                    CLEAR(AF0)                   RESET APU DECISION
A0B 076C4  16003FF9                    JUMPS(SCLRS,AF1)             IF AF1=1 THEN ZERO FILL!
A0C 076C6  18D41C84                    LOAD(BR1,INSTRS0(2),TF)      IQ="LOAD(BR1,MSS)"
A0D 076C8  1A300037                    SET(WI)                      LET APS OUTPUT CATCH-UP
A0E 076CA  1C000020                    NOP
A0F 076CC  1F500000           INS0     LOAD(BR1,MSS)                APU SETS MSS=BITS
A10 076CE  201933F1                    SUBL(BR1,1),JUMPN(BS0)       BS0 FOR BITS=0
A11 076D0  22192FF1                    SUBL(BR1,1),JUMPN(BS1)       BS1 FOR BITS=1
A12 076D2  241927F1                    SUBL(BR1,1),JUMPN(BS2)       BS2 FOR BITS=2
A13 076D4  261921F1                    SUBL(BR1,1),JUMPN(BS3)       BS3 FOR BITS=3
A14 076D6  28191BF1                    SUBL(BR1,1),JUMPN(BS4)       BS4 FOR BITS=4
A15 076D8  2A8A0002           BS5      ADD(BR0,WS,TF)               IQ=DCTT(J)
A16 076DA  2CD41C90                    LOAD(BR1,NLS5(2),TF)         IQ=NL=16
A17 076DC  2EAA0002                    ADD(BR2,WS,TF)               IQ=DCT1T(J)
A18 076DE  30D41D12                    LOAD(BR1,DTHRS5(2),TF)       IQ=DTHR(5 LEVEL)
A19 076E0  329A0002                    ADD(BR1,WS,TF)               IQ=DTHR(OFFSET+I)
A1A 076E2  34003860                    JUMP(ADDSI)                  LET APU CATCH-UP
A1B 076E4  368A0002           BS4      ADD(BR0,WS,TF)               IQ=DCTT(J)
A1C 076E6  38D41C8F                    LOAD(BR1,NLS4(2),TF)         IQ=NL=8
A1D 076E8  3AAA0002                    ADD(BR2,WS,TF)               IQ=DCT1T(J)
A1E 076EA  3CD41CF2                    LOAD(BR1,DTHRS4(2),TF)       IQ=DTHR(4 LEVEL)
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A1F 076EC 3E9A0002 (00216)          ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I)
A20 076EE 40003860 (00217)          JUMP(ADDSI)                       LET APU CATCH-UP
A21 076F0 42BA0002 (00218) BS3      ADD(BR0,WS,TF)                    IQ=DCTT(J)
A22 076F2 44D41C8C (00219)          LOAD(BR1,NLS3(2),TF)              IQ=NL=4
A23 076F4 46AA0002 (00220)          ADD(BR2,WS,TF)                    IQ=DCT1T(J)
A24 076F6 48D41CD2 (00221)          LOAD(BR1,DTHRS3(2),TF)            IQ=DTHR(3 LEVEL)
A25 076F8 4A9A0002 (00222)          ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I)
A26 076FA 4C003860 (00223)          JUMP(ADDSI)                       LET APU CATCH-UP
A27 076FC 4EBA0002 (00224) BS2      ADD(BR0,WS,TF)                    IQ=DCTT(J)
A28 076FE 50D41CBA (00225)          LOAD(BR1,NLS2(2),TF)              IQ=NL=2
A29 07700 52AA0002 (00226)          ADD(BR2,WS,TF)                    IQ=DCT1T(J)
A2A 07702 54D41CB2 (00227)          LOAD(BR1,DTHRS2(2),TF)            IQ=DTHR(2 LEVEL)
A2B 07704 569A0002 (00228)          ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I)
A2C 07706 58003860 (00229)          JUMP(ADDSI)                       LET APU CATCH-UP
A2D 07708 5ABA0002 (00230) BS1      ADD(BR0,WS,TF)                    IQ=DCTT(J)
A2E 0770A 5CD41CBB (00231)          LOAD(BR1,NLS1(2),TF)              IQ=NL=1
A2F 0770C 5EAA0002 (00232)          ADD(BR2,WS,TF)                    IQ=DCT1T(J)
A30 0770E 60D41C92 (00233)          LOAD(BR1,DTHRS01(2),TF)           IQ=DTHR(1 LEVEL)
A31 07710 629A0002 (00234)          ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I)
A32 07712 64003860 (00235)          JUMP(ADDSI)                       LET APU CATCH-UP
A33 07714 66BA0002 (00236) BS0      ADD(BR0,WS,TF)                    IQ=DCTT(J)
A34 07716 68D41CB6 (00237)          LOAD(BR1,NLS0(2),TF)              IQ=NL=0
A35 07718 6AAA0002 (00238)          ADD(BR2,WS,TF)                    IQ=DCT1T(J)
A36 0771A 6CD41C92 (00239)          LOAD(BR1,DTHRS01(2),TF)           IQ=DTHR(0 LEVEL)
A37 0771C 6E9A0002 (00240)          ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I)
A38 0771E 709A0002 (00241) ADDSI    ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I+1)
A39 07720 729A0002 (00242)          ADD(BR1,WS,TF)                    IQ=DTHR(OFFSET+I+2)
A3A 07722 74300037 (00243)          SET(W1)                           WAIT FOR THRESHOLD DEC.
A3B 07724 76000020 (00244)          NOP                               RELEASED BY APU
A3C 07726 780038A8 (00245)          JUMPC(ADDSI,AF0)                  APU DECISION ON AF0
A3D 07728 7A0008AB (00246)          JUMPC(IINCSI,AF3)                 FOR I=0,1,2...LTH-1
                   (00247) *
A3E 0772A 7CC203CF (00248) SCLRS    LOAD(BR0,SAS3B(1),TF)             IQ=2**(-15)
A3F 0772C 7EC2039B (00249)          LOAD(BR0,SAS11(1),TF)             IQ=2**(-16)
A40 0772E 8040207A (00250)          LOAD(BF0,(2))                     TMP1(.) BA
A41 07730 82500000 (00251)          LOAD(BR1,MSS)                     TMP1(.) SIZE-1
A42 07732 84020000 (00252)          SUB(BR0,MSS)                      TMP1(.) BA-2
A43 07734 86BA0002 (00253) IFIXSI   ADD(BR0,WS,TF)                    IQ=TMP1(I)
A44 07736 88BA0002 (00254)          ADD(BR0,WS,TF)                    IQ=TMP1(I+1)
A45 07738 8A1943B2 (00255)          SUBL(BR1,2),JUMPP(IFIXSI)         FOR I=0,1,2...LTH-1
                   (00256) *
A46 0773A 8C200031 (00257) DNEST    CLEAR(R1)                         INPUT DONE!
A47 0773C 8E000020 (00258)          NOP
                   (00259) *
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A48 0773E 90300032 (00260) G104S0  SET(RA)                              ENABLE APU
A49 07740 92402012 (00261)         LOAD(BW0,(2))                        TMP1(.) BA
A4A 07742 94500000 (00262)         LOAD(BW1,MSS)                        TMP1(.) SIZE-1
A4B 07744 96020000 (00263)         SUB(BW0,MSS)                         TMP1(.) BA-2
A4C 07746 99641CB5 (00264) 0INCSJ  LOAD(BW2,INSTRS0+1(2),TF)            MSS=BITS IN INS0
A4D 07748 9A200030 (00265)         CLEAR(R0)                            STALL APS OUTPUT
A4E 0774A 9C000020 (00266)         NOP                                  RELEASED BY APU
A4F 0774C 9E0056E9 (00267)         JUMPS(CLRSTMP,AF1)                   IF AF1=1 THEN ZERO FILL
A50 0774E A0E3EEC0 (00268)         LOAD(BW2,APSSPEM(1),TF)              INSTRS0 INTO APS INPUT
A51 07750 A2200030 (00269)         CLEAR(R0)                            STALL APS OUTPUT
A52 07752 A4000020 (00270)         NOP
A53 07754 A6BA0002 (00271)         ADD(BW0,WS,TF)                       OO=TMP3(J)
A54 07756 A8114CB1 (00272)         SUBL(BW1,1),JUMPP(0INCSJ)            FOR J=0,1...LTH-1
A55 07758 AA305968 (00273)         JUMP(OFIXS,AF3),SET                  SIGNAL END TO APS INPUT
                   (00274) *
A56 0775A ACBA0002 (00275) CLRSTMP ADD(BW0,WS,TF)                       OO=TMP3(J)
A57 0775C AE1156B1 (00276)         SUBL(BW1,1),JUMPP(CLRSTMP)           FOR J=2...LTH-1
A58 0775E B0200030 (00277)         CLEAR(R0)                            STALL APS OUTPUT
                   (00278) *
A59 07760 B2400020 (00279) OFIXS   LOAD(BW0,(0))                        ODCT(.) BA
A5A 07762 B4500000 (00280)         LOAD(BW1,MSS)                        ODCT(.) SIZE-1
A5B 07764 B6020000 (00281)         SUB(BW0,MSS)                         ODCT(.) BA-1
A5C 07766 B8700003 (00282)         LOAD(BW3,3)                          3+1=4 DUMMIES
A5D 07768 BAE20794 (00283) #1      LOAD(BW2,DMYS(1),TF)                 OO=?
A5E 0776A BC315D81 (00284)         SUBL(BW3,1),JUMPP(#1)                4 TIMES
A5F 0776C BE0A0001 (00285) OFIXSI  ADD(BW0,HS,TF)                       OO=ODCT(I)
A60 0776E C10A0001 (00286)         ADD(BW0,HS,TF)                       OO=ODCT(I+1)
A61 07770 C2115EB2 (00287)         SUBL(BW1,2),JUMPP(OFIXSI)            FOR I=0,1,2...LTH-1
                   (00288) *
A62 07772 C4200030 (00289) DNES0   CLEAR(R0)                            OUTPUT DONE!
A63 07774 C6000020 (00290)         NOP
                   (00291) *
          00007760 (00292)         G104SA= #C                           ASSIGN VALUE TO CHAIN AN
                   (00293) ;                                            CHOR
    07776          (00294)         END #A-1
                   (00295) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    07776 00000000 (00296) G104SI  DATA 4E'0,0'
    ...
          00000000 (00297)         G104SZ=#L-G104S
    0777E          (00298)         END
```

```
ADDS1:      0003B (00211) (00217) (00223) (00229) (00235) (00241) (00245)
AFDTSORG:   008EB (00009) (00030)
APSSMEM:    1FFC0 (00010) (00268)
BS0:        00033 (00201) (00236)
BS1:        0002D (00202) (00230)
BS2:        00027 (00203) (00224)
BS3:        00021 (00204) (00218)
BS4:        0001B (00205) (00212)
BS5:        00015 (00206)
BITSOK:     00012 (00087) (00096) (00096)
CLRS:       0000D (00091) (00094)
CLRSFLG:    00023 (00112) (00114)
CLRSTEP:    00056 (00267) (00275) (00276)
CSPUSNOS:   021EC (00011) (00033)
DCTSN:      00022 (00110) (00113)
DMYS:       00794 (00012) (00283)
DNFSA:      0004B (00165)
DNFS1:      00046 (00257)
DFFS0:      00062 (00289)
DTHRS01:    01C92 (00050) (00233) (00239)
DTHRS2:     01CB2 (00052) (00227)
DTHRS3:     01CD2 (00054) (00221)
DTHRS4:     01CF2 (00056) (00215)
DTHRS5:     01D12 (00059) (00209)
FIXSQ:      00043 (00095) (00143) (00149) (00153)
G104S:      076AF (00032) (00178) (00184) (00297)
G104SA:     07760 (00181) (00292)
G104S1:     07776 (00176) (00296)
G104S0:     0004B (00185) (00260)
G104SZ:     0000D (00180) (00297)
HS:         00001 (00014) (00193) (00285) (00286)
IFIXS1:     00043 (00253) (00255)
IINCS1:     0000B (00193) (00246)
IKS0:       0000F (00041) (00200)
INCSJ:      00005 (00080) (00145) (00151)
INSTRS0:    01CB4 (00041) (00197) (00264)
ISAS001:    00503 (00018) (00187)
ISVTS:      00502 (00017) (00018)
LOOPS:      00027 (00118) (00139)
MS:         00000 (00015)
MSS:        00000 (00016) (00189) (00190) (00200) (00251) (00252) (00262) (00263) (00280) (00281)
NLS0:       01CB6 (00043) (00237)
NLS1:       01CB8 (00044) (00231)
NLS2:       01CBA (00045) (00225)
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NLS3:     01CBC (00046) (00219)
NLS4:     01CBE (00047) (00213)
NLS5:     01C90 (00048) (00207)
OFIXS:    00059 (00273) (00279)
OFIXS1:   0005F (00285) (00287)
OINCSJ:   0004C (00264) (00272)
QUANS:    07602 (00031) (00073)
QUANSSA:  00000 (00071) (00075) (00169)
QUANSSZ:  00052 (00072) (00169) (00170)
SAS11:    0039B (00020) (00249)
SAS38:    003CF (00021) (00218)
SAS39:    003D0 (00022)
SCLRS:    0003F (00178) (00196) (00248)
START:    07600 (00023) (00064)
SVTS:     003B2 (00019) (00020) (00021) (00022)
T3S:      00039 (00125) (00136) (00140)
T4S:      0003F (00126) (00137) (00146)
TMP3S:    00F00 (00024) (00191)
TMP4S:    00C00 (00025) (00192)
WS:       00002 (00026) (00206) (00208) (00210) (00212) (00214) (00216) (00218) (00220) (00222)
                (00224) (00226) (00228) (00230) (00232) (00234) (00236) (00238) (00240) (00241)
                (00242) (00253) (00254) (00271) (00275)
ZS:       00003 (00027)
ZEROS:    0000A (00088)

LINES WITH ERRORS:    0   (MAP VERSION R00101.10)   F-    0
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                   (00001) *  FCB 251... "MPESTD(Y,U,V,W)"    DEQUANTIZE DCT PARAMETERS
                   (00002) *                                  ORIGINATED:14-JAN-80
                   (00003) *                                  UPDATED:07-APR-80
                   (00004) *  DEFINE GLOBAL SYMBOLS
                   (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                   (00006)         OPADD DOF, (3 .LS. 10) + (12 .LS. 5) + $1B
                   (00007)         OPADD WAENE, (1 .LS. 10) + (12 .LS. 5) + $1A
                   (00008)         OPADD ED, (3 .LS. 10) + (12 .LS. 5) + $1C
          00000BEB (00009)         AFDTSORG=$BEB
          0001FFC0 (00010)         APS$MEM=$1FFC0
          000021FC (00011)         CSPUSNOS=$21FC
          00000400 (00012)         DRDCTS=D'1024'
          00000003 (00013)         #M=3
          00000001 (00014)         HS=1
                   (00015) *  IBITS=D'2088'
                   (00016) *  MIB'T2=>IBIT
          00002A28 (00017)         IBITS=D'10792'
          00000000 (00018)         MS=0
          00000000 (00019)         MSS=0
          00000382 (00020)         SVTS=$0382
          000003CE (00021)         SAS38=SVTS+2*D'38'
          000003D0 (00022)         SAS39=SVTS+2*D'39'
          000077E0 (00023)         START=$77E0
                   (00024) *  TMP4S=D'3072'
                   (00025) *  DCT1T2=>TMP4
          00002528 (00026)         TMP4S=D'9512'
          00000002 (00027)         WS=2
          00000003 (00028)         ZS=3
                   (00029) *
                   (00030) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
          00000BCA (00031)         #L=AFDTSORG+3*2*(251-128)                        FCB 251
00BCA 001F77E2 (00032)         ADDR QUANS(R7,1)
00BCC 001F7874 (00033)         ADDR G104S(R7,1)
00BCE 001021FC (00034)         ADDR CSPUSNOS(,1,0)
                   (00035)         EJECT
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                   (00036) *
                   (00037) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                   (00038) *
                   (00039)                 BUS 2
          00001D4C (00040)                 #L=D'7500'
                   (00041)                 EVEN
01D4C 1E50         (00042) INSTRS1 DATA INS1*D'512'+X'50',X' 00'
01D4D 0000
01D4E 4A9A         (00043) INSTRS2 DATA INS2*D'512'+X'9A',X'0000'
01D4F 0000
01D50 E0AA         (00044) INSTRS4 DATA INDS4*D'512'+X'AA',X'0000'
01D51 0000
01D52 E4AA         (00045) INSTRS5 DATA INDS5*D'512'+X'AA',X'0000'
01D53 0000
01D54 CEAA         (00046) INSTRS6 DATA INDS6*D'512'+X'AA',X'0000'
01D55 0000
01D56 D2AA         (00047) INSTRS7 DATA INDS7*D'512'+X'AA',X'0000'
01D57 0000
01D58 00000000 (00048) DECS0   DATA 1E'0.0'
01D5A 00000000 (00049)         DATA 1E'-0.0'
01D5C 5AB240C0 (00050) DECS1   DATA 1E'0.7071'
01D5E DAB240C0 (00051)         DATA 1E'-0.7071'
01D60 35B573C0 (00052) DECS2   DATA 1E'0.4196',1E'1.8340'
01D62 0EAC0841
01D64 B5B573C0 (00053)         DATA 1E'-0.4196',1E'-1.8340'
01D66 8EAC0841
01D68 1DE00040 (00054) DECS3   DATA 1E'0.2334',1E'0.8330',1E'1.6725',1E'3.0867'
01D6A 6A9EBE40
01D6C 0D6147C1
01D6E 18B18EC1
01D70 9DE00040 (00055)         DATA 1E'-0.2334',1E'-0.8330',1E'-1.6725',1E'-3.0867'
01D72 EA9EBE40
01D74 8D6147C1
01D76 98B18EC1
01D78 0FDE3B40 (00056) DECS4   DATA 1E'0.1240',1E'0.4048',1E'0.7287',1E'1.1110'
01D7A 33D07CC0
01D7C 5D460AC0
01D7E 08E353C1
01D80 0C9E55C1 (00057)         DATA 1E'1.5778',1E'2.1773',1E'3.0169',1E'4.4311'
01D82 116B1C41
01D84 18229C41
01D86 2372E4C1
01D88 8FDE3B40 (00058)         DATA 1E'-0.1240',1E'-0.4048',1E'-0.7287',1E'-1.1110'
01D8A B3D07CC0
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01D8C DD460AC0
01D8E 8BE353C1
01D90 8C9E55C1 (00059)          DATA 1E'-1.5778',1E'-2.1773',1E'-3.0169',1E'-4.4311'
01D92 9168:C41
01D94 98229C41
01D96 A372E4C1
01D98 08412BC0 (00060) DECS5    DATA 1E'0.0640',1E'0.2004',1E'0.3461',1E'0.5025'
01D9A 19A66540
01D9C 2C4D0140
01D9E 40516EC0
01DA0 55F3B640 (00061)          DATA 1E'0.6715',1E'0.8550',1E'1.0559',1E'1.2779'
01DA2 6D70A3C0
01DA4 08727BC1
01DA6 0A3923C1
01DA8 0C350B41 (00062)          DATA 1E'1.5259',1E'1.8068',1E'2.1306',1E'2.5129'
01DAA 0E7453C1
01DAC 110B7B41
01DAE 141A6B41
01DB0 17D66CC1 (00063)          DATA 1E'2.9797',1E'3.5793',1E'4.4188',1E'5.8330'
01DB2 1CA26B41
01DB4 2359B3C1
01DB6 2EA9EBC1
01DB8 88312BC0 (00064)          DATA 1E'-0.0640',1E'-0.2004',1E'-0.3461',1E'-0.5025'
01DBA 99A66540
01DBC AC3D0140
01DBE C0516EC0
01DC0 D5F3B640 (00065)          DATA 1E'-0.6715',1E'-0.8550',1E'-1.0559',1E'-1.2779'
01DC2 ED70A3C0
01DC4 88727BC1
01DC6 8A3923C1
01DC8 8C350B41 (00066)          DATA 1E'-1.5259',1E'-1.8068',1E'-2.1306',1E'-2.5129'
01DCA 8E7453C1
01DCC 910B7B41
01DCE 941A6B41
01DD0 97D66CC1 (00067)          DATA 1E'-2.9797',1E'-3.5793',1E'-4.4188',1E'-5.8330'
01DD2 9CA26B41
01DD4 A359B3C1
01DD6 AEA9EBC1
               (00068)          BUS 1
      000077E0 (00069)          #L=START
               (00070)          EVEN
               (00071)          EJECT
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                        (00072) *
                        (00073) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00074) *
                        (00075)          EVEN
    077F0 0000          (00076)          DATA QUANSSA                      START ADDRESS
    077F1 0045          (00077)          DATA QUANSSZ                      MODULE SIZE
                        (00078) QUANS    BEGIN APU(QUAN)
          00000000      (00079)          *A=0
A00 077E2 20530000      (00080) QUANSSA  SET(UN)\NOP                       FIXED PT. OP.
A01 077E4 08FC0000      (00081) STARTS   MOV(IQA,O0)\NOP                   IBIT(I)->INSTRS1+1
A02 077E6 90180002      (00082) #1       JUMPC(#1,O0F)                     WAIT4 INSTRS1+1 REWRITE
A03 077E8 20370000      (00083)          CLEAR(WI)\NOP                     RELEASE APS INPUT
A04 077EA 20500000      (00084) LOOPS    SET(RO)\NOP                       RELEASE APS OUTPUT
A05 077EC 08FC0000      (00085)          MOV(IQA,O0)\NOP                   INSTRS1 INTO INS1
A06 077EE 08FE0000      (00086)          MOV(IQA,M7)\NOP                   M7=TMP4(I)=DCT1(J)
A07 077F0 08F00000      (00087)          MOV(IQA,A0)\NOP                   A0=M=QDCT(I)
A08 077F2 40000000      (00088)          ADD(A0,A0)\NOP                    2M
A09 077F4 90180009      (00089) #2       JUMPC(#2,O0F)                     WAIT4 INS1 REWRITE
A0A 077F6 20500000      (00090)          SET(RO)\NOP                       RELEASE APS OUTPUT
A0B 077F8 20370000      (00091)          CLEAR(WI)\NOP                     RELEASE APS INPUT
A0C 077FA 089C0000      (00092)          MOV(R,O0)\NOP                     2M->INSTRS2+1
A0D 077FC 9013000D      (00093) #5       JUMPC(#5,O0F)                     WAIT4 INSTRS2+1 REWRITE
A0E 077FE 9017000E      (00094) #7       JUMPC(#7,WI)                      WAIT4 APS TO STALL!
A0F 07B00 20370000      (00095)          CLEAR(WI)\NOP                     RELEASE APS INPUT
A10 07B02 20500000      (00096)          SET(RO)\NOP                       RELEASE APS OUTPUT
A11 07B04 08FC0000      (00097)          MOV(IQA,O0)\NOP                   INSTRS2 INTO INS2
A12 07B06 20330000      (00098)          CLEAR(UN)\NOP                     FLOATING PT. OP.
A13 07B08 90180013      (00099) #6       JUMPC(#6,O0F)                     WAIT4 INS2 REWRITE
A14 07B0A 20370000      (00100)          CLEAR(WI)\NOP                     RELEASE APS INPUT
A15 07B0C 20500000      (00101)          SET(RO)\NOP                       RELEASE APS OUTPUT
A16 07B0E 08F80000      (00102)          MOV(IQA,M0)\NOP                   M0=DEC#(2M)
A17 07B10 84600000      (00103)          MUL(M0,M7)\NOP                    DEC$#(2M)*TMP4(I)
A18 07B12 08FC0000      (00104)          MOV(IQA,O0)\NOP                   IBIT(I+1)->INSTRS1+1
A19 07B14 088C0000      (00105)          MOV(P,O0)\NOP                     O0=TMP1(I)=>DRDCT(J)
A1A 07B16 20530000      (00106)          SET(UN)\NOP                       FIXED PT. OP.
A1B 07B18 9018001B      (00107) #3       JUMPC(#3,O0F)                     WAIT4 FOR 2 O0'S TO SETT
                        (00108) ;                                          LE
A1C 07B1A 20370000      (00109)          CLEAR(WI)\NOP                     RELEASE APS INPUT
A1D 07B1C 90080004      (00110)          JUMPC(LOOPS,AF3)                  FOR I=0,1,2...LTH-1
                        (00111) *
A1E 07B1E 20500000      (00112) SHUFLSV  SET(RO)\NOP                       RELEASE APS OUTPUT
A1F 07B20 081C081C      (00113)          MOV(ZERO,O0)                      INSTRS4+1=0;INSTRS5+1=0
A20 07B22 081C081C      (00114)          MOV(ZERO,O0)                      INSTRS6+1=0;INSTRS7+1=0
A21 07B24 20370000      (00115)          CLEAR(WI)\NOP                     RELEASE APS INPUT
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A22 07826 08F00000 (00116)         MOV(IQA,A0)\NOP                    A0=J
A23 07828 000008F0 (00117)         NOP\MOV(IQA,A0)                    A0=K
A24 0782A 40004000 (00118)         ADD(A0,A0)                         2J;2K
A25 0782C 08F10000 (00119)         MOV(IQA,A1)\NOP                    A1=J'
A26 0782E 000008F1 (00120)         NOP\MOV(IQA,A1)                    A1=K'
A27 07830 413C413C (00121)         MOV(DQ),ADD(A1,A1)                 2J->INSTR$6+1,2J';2K->IN
                   (00122) ;                                          STR$7+1,2K'
A28 07832 08FC0000 (00123)         MOV(IQA,DQ)\NOP                    INSTR$4 INTO IND$4
A29 07834 000008FC (00124)         NOP\MOV(IQA,DQ)                    INSTR$5 INTO IND$5
A2A 07836 08F00000 (00125)         MOV(IQA,NULL)\NOP                  NULL=TMP1(J*)
A2B 07838 000008F0 (00126)         NOP\MOV(IQA,NULL)                  NULL=TMP1(K*)
A2C 0783A 08F20000 (00127)         MOV(IQA,A2)\NOP                    A2=J''
A2D 0783C 000008F2 (00128)         NOP\MOV(IQA,A2)                    A2=K''
A2E 0783E 425C425C (00129)         MOV(DQ),ADD(A2,A2)                 2J'->INSTR$4+1,2J'';2K'-
                   (00130) ;                                          >INSTR$5+1,2K''
A2F 07840 08FC0000 (00131)         MOV(IQA,DQ)\NOP                    INSTR$6 INTO IND$6
A30 07842 000008FC (00132)         NOP\MOV(IQA,DQ)                    INSTR$7 INTO IND$7
A31 07844 08F00000 (00133)         MOV(IQA,NULL)\NOP                  NULL=TMP1(J*)
A32 07846 000008F0 (00134)         NOP\MOV(IQA,NULL)                  NULL=TMP1(K*)
A33 07848 08F10000 (00135) SHUFLS  MOV(IQA,A1)\NOP                    A1=J'
A34 0784A 000008F1 (00136)         NOP\MOV(IQA,A1)                    A1=K'
A35 0784C 413C413C (00137)         MOV(DQ),ADD(A1,A1)                 2J->INSTR$6+1,2J';2K->IN
                   (00138) ;                                          STR$7+1,2K'
A36 0784E 08FC0000 (00139)         MOV(IQA,DQ)\NOP                    INSTR$4 INTO IND$4
A37 07850 000008FC (00140)         NOP\MOV(IQA,DQ)                    INSTR$5 INTO IND$5
A38 07852 08FC0000 (00141)         MOV(IQA,DQ)\NOP                    DRDCT(I)=TMP1(J*)
A39 07854 000008FC (00142)         NOP\MOV(IQA,DQ)                    DRDCT(I+1)=TMP1(K*)
A3A 07856 08F20000 (00143)         MOV(IQA,A2)\NOP                    A2=J''
A3B 07858 000008F2 (00144)         NOP\MOV(IQA,A2)                    A2=K''
A3C 0785A 425C425C (00145)         MOV(DQ),ADD(A2,A2)                 2J'->INSTR$4+1,2J'';2K'-
                   (00146) ;                                          >INSTR$5+1,2K''
A3D 0785C 08FC0000 (00147)         MOV(IQA,DQ)\NOP                    INSTR$6 INTO IND$6
A3E 0785E 000008FC (00148)         NOP\MOV(IQA,DQ)                    INSTR$7 INTO IND$7
A3F 07860 08FC0000 (00149)         MOV(IQA,DQ)\NOP                    DRDCT(I+2)=TMP1(J*)
A40 07862 000008FC (00150)         NOP\MOV(IQA,DQ)                    DRDCT(I+3)=TMP1(K*)
A41 07864 901D0033 (00151)         JUMPC(SHUFLS,F1)                   FOR I=0,1,2...LTH-1
                   (00152) *
A42 07866 20420000 (00153) DNESA   CLEAR(RA)\NOP                      APU DONE!
A43 07868 00000000 (00154)         NOP
A44 0786A 10000000 (00155)         JUMP(0)
          00000045 (00156)         QUANSSZ=*A-QUANSSA
    0786C          (00157)         END QUANSSZ
                   (00158)         EJECT
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                        (00159) *
                        (00160) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00161) *
                        (00162)          EVEN
    0786C 00007960      (00163)          ADDR G104S1                   POINTER TO CONSTRUCTED I
                        (00164) *                                      NSTRUCTION BLOCK
    0786E 00007876      (00165)          ADDR G104S+2*SCLRS            POINTER TO SCALAR BLOCK
    07870 0000          (00166)          DATA 0                        NUMBER OF SCALARS
    07871 00E6          (00167)          DATA G104S7                   MODULE SIZE
    07872 0000792C      (00168)          ADDR G104SA                   POINTER TO CHAIN ANCHOR
                        (00169)          EVEN                          END ON WORD BOUNDARY
                        (00170) *
                        (00171) G104S    BEGIN APS(G104)
A00 07873 00204340      (00172)          JSN(G104S0,P2)                SET OUTPUT PC(PC2)
A01 07876 02300030      (00173) SCLRS    SET(R0)                       ENABLE APS OUTPUT
A02 07878 04601000      (00174)          LOAD(BR2,I1)                  QDCT(,) BA
A03 0787A 06500000      (00175)          LOAD(BR1,MSS)                 DUMMY OP FOR EXEC
A04 0787C 08220000      (00176)          SUB(BR2,MSS)                  QDCT(,) BA-1
A05 0787E 0A742A27      (00177)          LOAD(BR3,IBITS-1(2))          IBIT(,) BA-1
A06 07880 0C442526      (00178)          LOAD(BR0,TMP4S-2(2))          TMP4(,) BA-2
A07 07882 0E3A0001      (00179)          ADD(BR3,HS,TE)                IQ=IBIT(I)
A08 07884 10300037      (00180)          SET(WI)                       STALL APS INPUT
A09 07886 12000020      (00181)          NOP                           RELEASED BY APU
A0A 07888 14D41D4C      (00182) LOOPS1   LOAD(BR1,INSTRS1(2),TE)       REWRITE INS1
A0B 0788A 16BA0002      (00183)          ADD(BR0,WS,TE)                IQ=TMP4(I)=>DCT1(J)
A0C 0788C 192A0001      (00184)          ADD(BR2,HS,TE)                IQ=QDCT(I)
A0D 0788E 1A300037      (00185)          SET(WI)                       STALL APS INPUT
A0E 07890 1C310011      (00186)          MOVB(BW3,BR0)                 SAVE TMP4(,) ADDRESS
A0F 07892 1E500000      (00187) INS1     LOAD(BR1,MSS)                 APU SETS MSS=BITS
A10 07894 20191FE1      (00188)          SUBL(BR1,1),JUMPN(BS0)        BS0 FOR BITS=0
A11 07896 22191DE1      (00189)          SUBL(BR1,1),JUMPN(BS1)        BS1 FOR BITS=1
A12 07898 24191BE1      (00190)          SUBL(BR1,1),JUMPN(BS2)        BS2 FOR BITS=2
A13 0789A 261919E1      (00191)          SUBL(BR1,1),JUMPN(BS3)        BS3 FOR BITS=3
A14 0789C 281917E1      (00192)          SUBL(BR1,1),JUMPN(BS4)        BS4 FOR BITS=4
A15 0789E 2A541D9B      (00193) BS5      LOAD(BR1,DECS5(2))            DECS5(,) BA
A16 078A0 2C302177      (00194)          JUMP(STALS2,WI),SET           STALL APS INPUT
A17 078A2 2E541D7B      (00195) BS4      LOAD(BR1,DECS4(2))            DECS4(,) BA
A18 078A4 30302177      (00196)          JUMP(STALS2,WI),SET           STALL APS INPUT
A19 078A6 32541D6B      (00197) BS3      LOAD(BR1,DECS3(2))            DECS3(,) BA
A1A 078A8 34302177      (00198)          JUMP(STALS2,WI),SET           STALL APS INPUT
A1B 078AA 36541D60      (00199) BS2      LOAD(BR1,DECS2(2))            DECS2(,) BA
A1C 078AC 38302177      (00200)          JUMP(STALS2,WI),SET           STALL APS INPUT
A1D 078AE 3A541D5C      (00201) BS1      LOAD(BR1,DECS1(2))            DECS1(,) BA
A1E 078B0 3C302177      (00202)          JUMP(STALS2,WI),SET           STALL APS INPUT
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A1F 07B2 3E541058 (00203) BS0     LOAD(BR1,DECS0(2))                  DECS0(.) BA
A20 07B4 40300037 (00204)         SET(W1)                             STALL APS INPUT
A21 07B6 42000020 (00205) STALS2  NOP                                 RELEASED BY APU
A22 07B8 44C4104E (00206)         LOAD(BR0,INSTRS2(2),TE)             REWRITE INS2
A23 07BA 46300037 (00207)         SET(W1)                             STALL APS INPUT
A24 07BC 48090016 (00208)         MOVB(BR0,B*3)                       RECALL TMP4(.) ADDRESS
A25 07BE 4A9A0000 (00209) INS2    ADD(BR1,MSS,TE)                     APU SETS MSS,IO=2M
A26 07C0 4C3A0001 (00210)         ADD(BR3,HS,TE)                      IO=IBIT(I+1)
A27 07C2 4E300037 (00211)         SET(W1)                             STALL APS INPUT
A28 07C4 50000020 (00212)         NOP                                 RELEASED BY APU
A29 07C6 52000AAB (00213)         JUMPC(LOOPS1,AE3)                   FOR I=0,1,2...LTH-1
A2A 07C8 54300037 (00214)         SET(W1)                             STALL APS INPUT
A2B 07CA 56000020 (00215)         NOP                                 RELEASED BY APU
                  (00216)
                  (00217) *
A2C 07CC 59403054 (00218)         LOAD(BR0,I3),TE)                    IORDR(.) BA,IO=IORDR=J
A2D 07CE 5A500000 (00219)         LOAD(BR1,MSS)                       IORDR(.) SIZE-1
A2E 07D0 5D0A0000 (00220)         ADD(BR0,MSS,TE)                     IO=IORDR(1)=K
A2F 07D2 5E602006 (00221)         LOAD(BR2,I21)                       TMP1(.) BA
A30 07D4 60700000 (00222)         LOAD(BR3,MSS)                       DUMMY OP FOR EXEC
A31 07D6 62220000 (00223)         SUB(BR2,MSS)                        TMP1(.) BA-2
A32 07D8 6322000B (00224)         SUB(BR2,D'B')                       TMP1(.) BA-10.
A33 07DA 6619003C (00225)         ADDL(BR1,4)                         1 EXTRA LOOP IS NEEDED
A34 07DC 690A0001 (00226) INDSJ   ADD(BR0,HS,TE)                      IO=J'=IORDR(I+2)
A35 07DE 6B0A0001 (00227)         ADD(BR0,HS,TE)                      IO=K'=IORDR(I+3)
A36 07E0 6CE41050 (00228)         LOAD(BR3,INSTRS4(2),TE)             REWRITE INDS4
A37 07E2 6EE41052 (00229)         LOAD(BR3,INSTRS5(2),TE)             REWRITE INDS5
A38 07E4 70AA0002 (00230)         ADD(BR2,WS,TE)                      IO=TMP1(I)
A39 07E6 72AA0002 (00231)         ADD(BR2,WS,TE)                      IO=TMP1(I+1)
A3A 07E8 750A0001 (00232)         ADD(BR0,HS,TE)                      IO=J''
A3B 07EA 770A0001 (00233)         ADD(BR0,HS,TE)                      IO=K''
A3C 07EC 78E41054 (00234)         LOAD(BR3,INSTRS6(2),TE)             REWRITE INDS6
A3D 07EE 7AE41056 (00235)         LOAD(BR3,INSTRS7(2),TE)             REWRITE INDS7
A3E 07F0 7CAA0002 (00236)         ADD(BR2,WS,TE)                      IO=TMP1(I+2)
A3F 07F2 7EAA0002 (00237)         ADD(BR2,WS,TE)                      IO=TMP1(I+3)
A40 07F4 801934B4 (00238)         SUBL(BR1,4),JUMPP(INDSJ)            FOR I=0,1,2...LTH+1
                  (00239) *
A41 07F6 82200031 (00240) DNES1   CLEAR(R1)                           INPUT DONE!
A42 07F8 84000020 (00241)         NOP
                  (00242) *
A43 07FA 86300032 (00243) G104S0  SET(RA)                             ENABLE APU
A44 07FC 8830202A (00244)         LOAD(BW0,I21)                       TMP1(.) BA
A45 07FE 8A500000 (00245)         LOAD(BW1,MSS)                       TMP1(.) SIZE-1
A46 07900 8C020000 (00246)        SUB(BW0,MSS)                        TMP1(.) BA-2
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PAGE    8:        FCW 251... "MPESTD (,D,V,W)"     DEQUANTIZE DCT PARAMETERS

 A47 07902 8E641D3D (00247)          LOAD(BW2,INSTRS1+1(2),TF)        SET MSS IN INSTRS1
 A48 07904 90200030 (00248)          CLEAR(RO)                        STALL APS OUTPUT
 A49 07906 92000020 (00249)          NOP                              RELEASED BY APU
 A4A 07908 94E3FFC0 (00250) OINCSJ   LOAD(BW2,APSSMEM(1),TF)          REWRITE INS1
 A4B 0790A 96200030 (00251)          CLEAR(RO)                        STALL APS OUTPUT
 A4C 0790C 98000020 (00252)          NOP                              RELEASED BY APU
 A4D 0790E 9A641D3E (00253)          LOAD(BW2,INSTRS2+1(2),TF)        SET MSS=2M IN INSTRS2
 A4E 07910 9C200030 (00254)          CLEAR(RO)                        STALL APS OUTPUT
 A4F 07912 9E000020 (00255)          NOP                              RELEASED BY APU
 A50 07914 A0E3FFC0 (00256)          LOAD(BW2,APSSMEM(1),TF)          REWRITE INS2
 A51 07916 A2200030 (00257)          CLEAR(RO)                        STALL APS OUTPUT
 A52 07918 A4000020 (00258)          NOP                              RELEASED BY APU
 A53 0791A A7641D40 (00259)          LOAD(BW2,INSTRS1+1(2),TF)        SET MSS IN INSTRS1
 A54 0791C A8EA0002 (00260)          ADD(BWO,WS,TF)                   OO=TMP1(I)=>DRDCT(J)
 A55 0791E AA114AB1 (00261)          SUBL(BW1,1),JUMPP(OINCSJ)        FOR I=0,1...LTH-1
 A56 07920 AC300028 (00262)          SET(AF3)                         SIGNAL END TO APS INPUT
 A57 07922 AE200030 (00263)          CLEAR(RO)                        STALL APS OUTPUT
                    (00263) *
 A58 07924 B1441D51 (00265)          LOAD(BWO,INSTRS4+1(2),TF)        OO=O!
 A59 07926 B3441D53 (00266)          LOAD(BWO,INSTRS5+1(2),TF)        OO=O!
 A5A 07928 B5441D55 (00267)          LOAD(BWO,INSTRS6+1(2),TF)        OO=O!
 A5B 0792A B7441D57 (00268)          LOAD(BWO,INSTRS7+1(2),TF)        OO=O!
 A5C 0792C B8400030 (00269)          LOAD(BWO,[O])                    DUMMY OP FOR EXEC
 A5D 0792E BA500000 (00270)          LOAD(BW1,MSS)                    DRDCT(,) SIZE-1
 A5E 07930 BC020000 (00271)          SUB(BWO,MSS)                     DUMMY OP FOR EXEC
 A5F 07932 BE700002 (00272)          LOAD(BW3,2)                      4 INTERMEDIARY DUMMIES..
 A60 07934 C011003C (00273)          ADDL(BW1,4)                      & 1 EXTRA LOOP
 A61 07936 C3641D55 (00274) INDS1    LOAD(BW2,INSTRS6+1(2),TF)        SET MSS IN INSTRS6
 A62 07938 C5641D57 (00275)          LOAD(BW2,INSTRS7+1(2),TF)        SET MSS IN INSTRS7
 A63 0793A C6E3FFC0 (00276)          LOAD(BW2,APSSMEM(1),TF)          OVERWRITE INDS4
 A64 0793C C8E3FFC0 (00277)          LOAD(BW2,APSSMEM(1),TF)          OVERWRITE INDS5
 A65 0793E CA316AB1 (00278)          SUBL(BW3,1),JUMPP(DMYS1)         1 ST 4 OO'S ARE ?
 A66 07940 CC660100 (00279)          LOAD(BW2,DRDCTS(3))              DRDCT(,) BA
 A67 07942 CEAA0000 (00280) INDS6    ADD(BW2,MSS,TF)                  OO=DRDCT(J*)
 A68 07944 D0660400 (00281)          LOAD(BW2,DRDCTS(3))              DRDCT(,) BA
 A69 07946 D2AA0000 (00282) INDS7    ADD(BW2,MSS,TF)                  OO=DRDCT(K*)
 A6A 07948 D5641D51 (00283) DMYS1    LOAD(BW2,INSTRS4+1(2),TF)        SET MSS IN INSTRS4
 A6B 0794A D7641D53 (00284)          LOAD(BW2,INSTRS5+1(2),TF)        SET MSS IN INSTRS5
 A6C 0794C D8E3FFC0 (00285)          LOAD(BW2,APSSMEM(1),TF)          OVERWRITE INDS6
 A6D 0794E DAE3FFC0 (00286)          LOAD(BW2,APSSMEM(1),TF)          OVERWRITE INDS7
 A6E 07950 DC3173B1 (00287)          SUBL(BW3,1),JUMPP(DMYS2)         1 ST 4 OO'S ARE ?
 A6F 07952 DE660400 (00288)          LOAD(BW2,DRDCTS(3))              DRDCT(,) BA
 A70 07954 E0AA0000 (00289) INDS4    ADD(BW2,MSS,TF)                  OO=DRDCT(J*)
 A71 07956 E2660100 (00290)          LOAD(BW2,DRDCTS(3))              DRDCT(,) BA
```

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

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A091663

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A72 0795B F4AA0000 (00291) INDS5    ADD(BW2,MSS,TE)                                 DQ=DRDCT(K*)
A73 0795A F6116184 (00292) DMYS2    SUBL(BW1,4),JUMPP(INDS1)                        FOR I=-3,-2...LTH-1
                   (00293) *
A74 0795C FB200030 (00294) DNESO    CLEAR(RO)                                       OUTPUT DONE!
A75 0795E FA000020 (00295)          NOP
                   (00296) *
        0000792C (00297)          G104$A= *C                                        ASSIGN VALUE TO CHAIN AN
                   (00298) ;                                                        CHOR
    07960          (00299)          END *A-1
                   (00300) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    07960 00000000 (00301) G104$I   DATA 5F'0,0'
     ...
          000000F6 (00302)          G104$Z=*L-G104$
    0796A          (00303)          END
```

```
AFDTSORG:   00BFB (00009) (00031)
APSSMEM:    1FFC0 (00010) (00250) (00256) (00276) (00277) (00285) (00286)
BS0:        0001F (00188) (00203)
BS1:        0001D (00189) (00201)
BS2:        00018 (00190) (00199)
BS3:        00019 (00191) (00197)
BS4:        00017 (00192) (00195)
BS5:        00015 (00193)
CSPUSNOS:   021FC (00011) (00034)
DFCS0:      01D58 (00048) (00203)
DFCS1:      01D5C (00050) (00201)
DFCS2:      01D60 (00052) (00199)
DFCS3:      01D68 (00054) (00197)
DFCS4:      01D78 (00056) (00195)
DFCS5:      01D98 (00060) (00193)
DMYS1:      0006A (00278) (00283)
DMYS2:      00073 (00287) (00292)
DNFSA:      00042 (00153)
DNFSI:      00041 (00240)
DNFSU:      00074 (00294)
DRDCTS:     00400 (00012) (00279) (00281) (00288) (00290)
G104S:      07874 (00033) (00165) (00171) (00302)
G104SA:     0792C (00168) (00297)
G104SI:     07960 (00163) (00301)
G104SU:     00043 (00172) (00243)
G104SZ:     000F6 (00167) (00302)
HS:         00001 (00014) (00179) (00184) (00210) (00226) (00227) (00232) (00233)
IBITS:      02A28 (00017) (00177)
INS1:       0000F (00042) (00187)
INS2:       00025 (00043) (00209)
INDS4:      00070 (00044) (00289)
INDS5:      00072 (00045) (00291)
INDS6:      00067 (00046) (00280)
INDS7:      00069 (00047) (00282)
INDSI:      00061 (00274) (00292)
INDSJ:      00034 (00226) (00238)
INSTRS1:    01D4C (00042) (00182) (00247) (00259)
INSTRS2:    01D4F (00043) (00206) (00253)
INSTRS4:    01D50 (00044) (00228) (00265) (00283)
INSTRS5:    01D52 (00045) (00229) (00266) (00284)
INSTRS6:    01D54 (00046) (00234) (00267) (00274)
INSTRS7:    01D56 (00047) (00235) (00268) (00275)
LOOPS:      00004 (00084) (00110)
LOOPSI:     0000A (00182) (00213)
```

```
PAGE   11:      FCB 251... "MPESTD(Y,U,V,W)"    DEQUANTIZE DCT PARAMETERS

  MS:         00000 (00018)
  MSS:        00000 (00019) (00175) (00176) (00187) (00209) (00219) (00220) (00222) (00223) (00245)
                    (00246) (00270) (00271) (00280) (00282) (00289) (00291)
  DINCSJ:     0004A (00250) (00261)
  QUANS:      077F2 (00032) (00078)
  QUANSSA:    00000 (00076) (00080) (00156)
  QUANSSZ:    00045 (00077) (00156) (00157)
  SAS38:      003CF (00021)
  SAS39:      003D0 (00022)
  SCLRS:      00001 (00165) (00173)
  SHUFLS:     00033 (00135) (00151)
  SHUFLSV:    0001F (00112)
  STALS2:     00021 (00194) (00196) (00198) (00200) (00202) (00205)
  STAPT:      077E0 (00023) (00069)
  STARTS:     00001 (00081)
  SVTS:       003B2 (00020) (00021) (00022)
  TMP4S:      02528 (00026) (00178)
  WS:         00002 (00027) (00183) (00230) (00231) (00236) (00237) (00260)
  ZS:         00003 (00028)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   F=    0
```

```
                  (00001) *  FCB 252... "MPVDNM(Y,U,V)"       VAR.,DC,INTERPOLATE,FIX
                  (00002) *                                   ORIGINATED:18-JAN-80
                  (00003) *                                   UPDATED:29-MAY-80
                  (00004) *  DEFINE GLOBAL SYMBOLS
                  (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1F
                  (00006)         OPADD OUF, (3 .LS. 10) + (12 .LS. 5) + $1B
                  (00007)         OPADD WAENE, (1 .LS. 10) + (12 .LS. 5) + $1A
                  (00008)         OPADD EQ, (3 .LS. 10) + (12 .LS. 5) + $1C
         00000BEB (00009)         AFDTSORG=$BEB
         000021FC (00010)         CSPUSNOS=$21FC
         00000794 (00011)         DMYS=$0794
         00000003 (00012)         #M=3
         00000001 (00013)         HS=1
         00000000 (00014)         MS=0
         00000000 (00015)         MSS=0
         00000F16 (00016)         NOUTS=D'3862'
         000000F5 (00017)         NSIZES=D'246'-D'1'
         00000382 (00018)         SVTS=$0382
         00000398 (00019)         SAS11=SVTS+2*D'11'
         000003CE (00020)         SAS38=SVTS+2*D'38'
         000003D0 (00021)         SAS39=SVTS+2*D'39'
         0000044A (00022)         SAS100=SVTS+2*D'100'
         0000044C (00023)         SAS101=SVTS+2*D'101'
         00007980 (00024)         START=$7980
         00000002 (00025)         WS=2
         00000004 (00026)         WWS=4
         00000800 (00027)         X2S=D'2048'
         000000FF (00028)         XSIZES=D'256'-D'1'
         00000800 (00029)         YDMS=D'2048'
         00000009 (00030)         YSIZES=D'10'-D'1'
         00000003 (00031)         ZS=3
                  (00032) *
                  (00033) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
         00000BD0 (00034)         #L=AFDTSORG+3*2*(252-128)                   FCB 252
    0BD0 001F7998 (00035)         ADDR VDINS(R7,1)
    0BD2 001F7A12 (00036)         ADDR G100S(R7,1)
    0BD4 001021FC (00037)         ADDR CSPUSNOS(,1,0)
                  (00038)         EJECT
```

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                    (00039) *
                    (00040) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00041) *
          00007980  (00042)              #L=START
                    (00043)              EVEN
07980 00000000      (00044) FS0          DATA 1F'0.0'
07982 0CCCCCC0      (00045) FS1          DATA 1F'0.1'
07984 199999C0      (00046) FS2          DATA 1F'0.2'
07986 26666640      (00047) FS3          DATA 1F'0.3'
07988 33333340      (00048) FS4          DATA 1F'0.4'
0798A 40000040      (00049) FS5          DATA 1F'0.5'
0798C 4CCCCCC0      (00050) FS6          DATA 1F'0.6'
0798E 599999C0      (00051) FS7          DATA 1F'0.7'
07990 66666640      (00052) FS8          DATA 1F'0.8'
07992 73333340      (00053) FS9          DATA 1F'0.9'
07994 08000041      (00054) FSA          DATA 1F'1.0'
                    (00055)              EJECT
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                        (00056) *
                        (00057) *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00058) *
                        (00059)          EVEN
    07996 0000          (00060)          DATA VDIN$SA                            START ADDRESS
    07997 0039          (00061)          DATA VDIN$SZ                            MODULE SIZE
                        (00062) VDIN$    BEGIN APU(VDIN)
          00000000      (00063)          #A=0
A00 07998 00000000      (00064) VDIN$SA NOP                                      START-UP
A01 0799A 08E708E5      (00065)          MOV(IQA,A7)\MOV(IQA,A5)                 .1
A02 0799C 47E01680      (00066)          ADD(A7,A7)\K(1)
A03 0799E 08EF08EF      (00067)          MOV(IQA,M7)                             VAR
A04 079A0 08E308E3      (00068)          MOV(IQA,A3)                             DC
A05 079A2 0898089B      (00069)          MOV(R,EX0)                              .2\1.0
A06 079A4 0AE746B6      (00070)          MOV(A7),NEG(A7)\MOV(A6),ADD(A5,A6)      .2;-.2\1.0;1,1
A07 079A6 08560657      (00071)          MOV(EXT,A6)\MOV(EXT,A7)                 1.0\.2
A08 079A8 08EE08EE      (00072)          MOV(IQA,M6)                             SA (=2**16)
A09 079AA 47D50AB6      (00073)          MOV(A5),ADD(A6,A7)\MOV(A6),NEG(A5)      -.2=NMPY(-2);1.2\1.1=OMP
                        (00074) ;                                                Y(-1);.1
A0A 079AC 08E208E2      (00075)          MOV(IQA,A2)                             SB
A0B 079AE 08EB0000      (00076)          MOV(IQA,M3)\NOP                         NEW(0)
A0C 079B0 08960895      (00077)          MOV(R,A6)\MOV(R,A5)                     1.2=OMPY(-2)\.1=NMPY(-1)
A0D 079B2 000008EB      (00078)          NOP\MOV(IQA,M3)
                        (00079) *LOOP FOR I=0,2,...,N
A0E 079B4 85F185F1      (00080) #1       MOV(A1),MUL(M3,M7)                      MNEW(I-2);VAR*NEW(I)
A0F 079B6 411C411C      (00081)          MOV(OQ),ADD(A0,A1)                      OUTPUT FIX(I-4);MOLD(I-2
                        (00082) ;                                                )+MNEW(I-2)=INT(I-2)
A10 079B8 08E80000      (00083)          MOV(IQA,M0)\NOP                         OLD(I)
A11 079BA 000008E8      (00084)          NOP\MOV(IQA,M0)                         OLD(I+1)
A12 079BC 4FCA4FCA      (00085)          MOV(M2),SUB(A6,A7)                      INT(I-2);OMPY(I-2)-.2=OM
                        (00086) ;                                                PY(I)
A13 079BE 85518551      (00087)          MOV(A1),MUL(M2,M6)                      VAR*NEW(I);INT(I-2)*SA
A14 079C0 088C088C      (00088)          MOV(R,M4)                               OMPY(I)
A15 079C2 47B647B6      (00089)          MOV(A6),ADD(A5,A7)                      OMPY(I);NMPY(I-2)+.2=NMP
                        (00090) ;                                                Y(I)
A16 079C4 088D088D      (00091)          MOV(R,M5)                               NMPY(I)
A17 079C6 43354335      (00092)          MOV(A5),ADD(A1,A3)                      NMPY(I);VAR*NEW(I)+DC=NE
                        (00093) ;                                                W'(I)
A18 079C8 84148414      (00094)          MOV(A4),MUL(M0,M4)                      INT(I-2)*SA;OLD(I)*OMPY(
                        (00095) ;                                                I)=MOLD(I)
A19 079CA 02890289      (00096)          MOV(M1),R(A4)                           NEW'(I);INT(I-2)*SA
A1A 079CC 08EB0000      (00097)          MOV(IQA,M3)\NOP                         NEW(I+2)
A1B 079CE 000008EB      (00098)          NOP\MOV(IQA,M3)                         NEW(I+3)
A1C 079D0 528052B0      (00099)          ADDST(A4,A2)                            ROUND INT(I-2)*SA
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A1D 079D2 84B084B0 (00100)          MOV(A0),MUL(M1,M5)          MOLD(I);NEW'(I)*NMPY(I)=
                   (00101) ;                                    MNEW(I)
A1E 079D4 3A943A94 (00102)          MOV(A4),ALIGN(A4)           FIX(I-2)
A1F 079D6 9016000F (00103)          JUMPC(#1,FWI)
A20 079D8 20372037 (00104)          CLEAR(WI)
A21 079DA 00000000 (00105)          NOP
A22 079DC 089C089C (00106)          MOV(R,00)                   OUTPUT FIX(N-2)\FIX(N-1)
                   (00107) *LOOP FOR I=N+2, N+4, ..., N2+2
A23 079DE 85E485E4 (00108) #2       MOV(A4),MUL(M3,M7)          NEW'(I-4)*SA;NEW(I)*VAR
A24 079E0 02890289 (00109)          MOV(M1),R(A4)               NEW'(I-2);NEW'(I-4)*SA
A25 079E2 52805280 (00110)          ADDST(A4,A2)                ROUND NEW'(I-4)*SA
A26 079E4 84D184D1 (00111)          MOV(A1),MUL(M1,M6)          NEW(I)*VAR);NEW'(I-2)*SA
A27 079E6 3A943A94 (00112)          MOV(A4),ALIGN(A4)           FIX(I-4)
A28 079E8 08E80000 (00113)          MOV(IOA,M3)\NOP             NEW(I+2)
A29 079EA 000008E8 (00114)          NOP\MOV(IOA,M3)             NEW(I+3)
A2A 079EC 433C433C (00115)          MOV(OO),ADD(A1,A3)          OUTPUT FIX(I-4);NEW(I)*V
                   (00116) ;                                    AR+DC=NEW'(I)
A2B 079EE 90160023 (00117)          JUMPC(#2,FWI)
A2C 079F0 20372037 (00118)          CLEAR(WI)
A2D 079F2 00000000 (00119)          NOP
                   (00120) *LOOP FOR I=N2+2, N2+4, ..., N3-2
A2E 079F4 85E085E0 (00121) #3       MUL(M3,M7)                  NEW(I)*VAR
A2F 079F6 08B108B1 (00122)          MOV(P,A1)                   NEW(I)*VAR
A30 079F8 433C433C (00123)          MOV(OO),ADD(A1,A3)          OUTPUT NEW'(I-2);NEW(I)*
                   (00124) ;                                    VAR+DC=NEW'(I)
A31 079FA 08E80000 (00125)          MOV(IOA,M3)\NOP             NEW(I+2)
A32 079FC 000008E8 (00126)          NOP\MOV(IOA,M3)             NEW(I+3)
A33 079FE 9010002F (00127)          JUMPC(#3,FI)
A34 07A00 089C089C (00128)          MOV(R,OO)                   NEW'(N3-2)\NEW'(N3-1)
                   (00129) *
A35 07A02 00000000 (00130)          NOP                         PLACE FOR TIMING PATCH
A36 07A04 20260000 (00131) DNESA    CLEAR(G2)\NOP               END SYNTHESIZER TIMING
A37 07A06 20322032 (00132)          CLEAR(RA)
A38 07A08 00000000 (00133)          NOP
                   (00134) *
          00000039 (00135)          VDIN$SZ=$A-VDIN$SA
    07A0A          (00136)          END VDIN$SZ
                   (00137)          EJECT
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                       (00138) *
                       (00139) *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                       (00140) *
                       (00141)         EVEN
    07A0A 00007AA2     (00142)         ADDR G100$I                         POINTER TO CONSTRUCTED I
                       (00143) *                                           NSTRUCTION BLOCK
    07A0C 00007A14     (00144)         ADDR G100$+2*SCLR$                  POINTER TO SCALAR BLOCK
    07A0E 0000         (00145)         DATA 0                              NUMBER OF SCALARS
    07A0F 0092         (00146)         DATA G100$Z                         MODULE SIZE
    07A10 00007A9C     (00147)         ADDR G100$A                         POINTER TO CHAIN ANCHOR
                       (00148)         EVEN                                END ON WORD BOUNDARY
                       (00149) *
                       (00150) G100$   BEGIN APS(G100)
A00 07A12 00202F40     (00151)         JSN(G100$0,P2)                      SET OUTPUT PC(PC2)
A01 07A14 02300030     (00152) SCLR$   SET(R0)                             ENABLE APS OUTPUT
A02 07A16 04C27982     (00153)         LOAD(BR0,FS1(1),TF)                 .1
A03 07A18 06C2044C     (00154)         LOAD(BR0,SAS101(1),TF)              VAR
A04 07A1A 08C2044A     (00155)         LOAD(BR0,SAS100(1),TF)              DC
A05 07A1C 0AC203CF     (00156)         LOAD(BR0,SAS38(1),TF)               SA=2**-15
A06 07A1E 0CC2039B     (00157)         LOAD(BR0,SAS11(1),TF)               SB=2**-16
A07 07A20 0EC60800     (00158)         LOAD(BR0,X2S(3),TF)                 X2(,) BA,IO=X2R(0)
A08 07A22 105000FF     (00159)         LOAD(BR1,XSIZES)                    X2(,) SIZE-1
A09 07A24 126407FF     (00160)         LOAD(BR2,YOMS-2(2))                 YOM(,) BA-2
A0A 07A26 14700069     (00161)         LOAD(BR3,YSIZES)                    YOM(,) SIZE-1
A0B 07A28 16210017     (00162)         MOVB(BW2,BR3)
A0C 07A2A 18390011     (00163)         MOVB(BR3,BR0)                       I(-1)
A0D 07A2C 1A39002B     (00164)         ADDB(BR3,BR1)                       I(-1)+N-1
A0E 07A2E 1C39002B     (00165)         ADDB(BR3,BR1)                       I(-1)+2N-2
A0F 07A30 1E39002B     (00166)         ADDB(BR3,BR1)                       I(-1)+3N-3
A10 07A32 20B9002B     (00167)         ADDB(BR3,BR1,TF)                    R(N-1)=NEW(1)
A11 07A34 22190024     (00168)         SUBB(BR1,BW2)                       NEWZ-OLDZ=FIXZ
A12 07A36 24190024     (00169)         SUBB(BR1,BW2)                       NEWZ-2*OLDZ+1
                       (00170) *LOOP FOR I=0,2,...,N-2 WHERE N=OLDZ
A13 07A38 26AA0002     (00171) #1      ADD(BR2,2,TF)                       OLD(I)
A14 07A3A 28AA0002     (00172)         ADD(BR2,2,TF)                       OLD(I+1)
A15 07A3C 2ABA0004     (00173)         ADD(BR0,4,TF)                       NEW(I+2)
A16 07A3E 2CB90034     (00174)         SUBL(BR3,4,TF)                      NEW(I+2)
A17 07A40 2E2113B2     (00175)         SUBL(BW2,2),JUMPP(#1)
A18 07A42 30B20004     (00176)         SUB(BR0,4,TF)                       DUMMY
A19 07A44 32BA0004     (00177)         ADD(BR3,4,TF)                       DUMMY
A1A 07A46 34BA0004     (00178)         ADD(BR0,4,TF)                       NEW(N)
A1B 07A48 36B90034     (00179)         SUBL(BR3,4,TF)                      NEW(N+1)
A1C 07A4A 38300037     (00180)         SET(W1)                             STALL APS INPUT
                       (00181) *LOOP FOR I=0,2,...,N2-N-4
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A1D 07A4C 3A190034 (00182)          SUBL(BR1,4)                                N2=N-3
A1E 07A4E 3CHA0004 (00183) #2       ADD(BR0,4,TE)                              NEW(N+1+2)
A1F 07A50 3EB90034 (00184)          SUBL(BR3,4,TE)
A20 07A52 40191EB2 (00185)          SUBL(BR1,2),JUMPP(#2)
A21 07A54 42020004 (00186)          SUB(BR0,4)
A22 07A56 4439003C (00187)          ADDL(BR3,4)
A23 07A58 46500002 (00188)          LOAD(BR1,2)
                   (00189) *LOOP FOR I=N2-4,N2-2,...,N2 OR 6 DUMMIES
A24 07A5A 488A0004 (00190) #3       ADD(BR0,4,TE)                              NEW(I)
A25 07A5C 4AB90034 (00191)          SUBL(BR3,4,TE)
A26 07A5E 4C1924B1 (00192)          SUBL(BR1,1),JUMPP(#3)
A27 07A60 4E300037 (00193)          SET(WI)                                    STALL APS INPUT
A28 07A62 50640802 (00194)          LOAD(BR2,YOMS+2(2))                        YOM(,) BA+2
A29 07A64 52500009 (00195)          LOAD(BR1,YSIZES)                           YOM(,) SIZE-1
                   (00196) *LOOP FOR I=0,2,...,N2+OLDZ-2=N3-2
A2A 07A66 548A0004 (00197) #4       ADD(BR0,4,TE)
A2B 07A68 56B90034 (00198)          SUBL(BR3,4,TE)
A2C 07A6A 58192AB2 (00199)          SUBL(BR1,2),JUMPP(#4)
                   (00200) *
A2D 07A6C 5A200031 (00201) DNESI    CLEAR(RI)                                  INPUT DONE!
A2E 07A6E 5C000020 (00202)          NOP
                   (00203) *
A2F 07A70 5E300032 (00204) G100SO   SET(RA)                                    ENABLE APU
A30 07A72 60500003 (00205)          LOAD(BW1,3)                                3+1=4 DUMMIES
A31 07A74 63420794 (00206) DMYSO    LOAD(BW0,DMYS(1),TE)                       OO=?
A32 07A76 64113181 (00207)          SUBL(BW1,1),JUMPP(DMYSO)                   FOR I=0,1,..3
A33 07A78 66440F15 (00208)          LOAD(BW0,NOUTS-1(2))                       NOUT(,) BA-1
A34 07A7A 68500000 (00209)          LOAD(BW1,MSS)                              NOUT(,) SIZE-1
A35 07A7C 6A700009 (00210)          LOAD(BW3,YSIZES)                           YOM(,) SIZE-1
                   (00211) *  INTERPOLATED OUTPUTS
A36 07A7E 6D0A0001 (00212) #1       ADD(BW0,HS,TE)                             OO=NOUT(I)
A37 07A80 6F313681 (00213)          SUBL(BW3,1),JUMPP(#1)                      FOR I=0,1,...NSIZE-1
A38 07A82 71720794 (00214)          LOAD(BW3,DMYS(1),TE)                       OO=?
A39 07A84 73720794 (00215)          LOAD(BW3,DMYS(1),TE)                       OO=?
A3A 07A86 75720794 (00216)          LOAD(BW3,DMYS(1),TE)                       OO=?
A3B 07A88 77720794 (00217)          LOAD(BW3,DMYS(1),TE)                       OO=?
                   (00218) *  NON-INTERPOLATED OUTPUTS
A3C 07A8A 785000FB (00219)          LOAD(BW1,NSIZES-YSIZES-1)                  NSIZE-YSIZE-1
A3D 07A8C 7B0A0001 (00220) #2       ADD(BW0,HS,TE)                             OO=NOUT(I)
A3E 07A8E 7C113D81 (00221)          SUBL(BW1,1),JUMPP(#2)                      FOR I=YSIZE...NSIZE-1
                   (00222) *  NORMALIZED MEMORY
A3F 07A90 7E4407FF (00223)          LOAD(BW0,YOMS-2(2))                        YOM(,) BA-2
A40 07A92 80500009 (00224)          LOAD(BW1,YSIZES)                           Y(,) SIZE-1
A41 07A94 828A0002 (00225) #3       ADD(BW0,WS,TE)                             OO=YOM(I)
```

```
 A42 07A96 84114181 (00226)          SUBL(BW1,1),JUMPP(#3)                     FOR I=0,1...YSIZE-1
                    (00227) *
 A43 07A98 86200030 (00228) DNESO    CLEAR(RO)                                 OUTPUT DONE!
 A44 07A9A 88000020 (00229)          NOP
 A45 07A9C 8A400000 (00230)          LOAD(BW0,[0])
 A46 07A9E 8C500000 (00231)          LOAD(BW1,MSS)
 A47 07AA0 8E020000 (00232)          SUB(BW0,MSS)
                    (00233) *
           00007A9C (00234)          G100$A= #C                                ASSIGN VALUE TO CHAIN AN
                    (00235) ;                                                  CHDR
     07AA2          (00236)          END #A-1
                    (00237) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
     07AA2 00000000 (00238) G100SI   DATA 1F'0,0'
           00000092 (00239)          G100SZ=#L-G100S
     07AA4          (00240)          END
```

```
AFDTSORG:   008FB (00009) (00034)
CSPUSNOS:   021FC (00010) (00037)
DMYS:       00794 (00011) (00206) (00214) (00215) (00216) (00217)
DMYSO:      00031 (00206) (00207)
DNFSA:      00036 (00131)
DNFSI:      0002D (00201)
DNFSO:      00043 (00228)
FSO:        07980 (00044)
FS1:        07982 (00045) (00153)
FS2:        07984 (00046)
FS3:        07986 (00047)
FS4:        07988 (00048)
FS5:        0798A (00049)
FS6:        0798C (00050)
FS7:        0798E (00051)
FS8:        07990 (00052)
FS9:        07992 (00053)
FSA:        07994 (00054)
G100S:      07A12 (00036) (00144) (00150) (00239)
G100SA:     07A9C (00147) (00234)
G100SI:     07AA2 (00142) (00238)
G100SO:     0002F (00151) (00204)
G100SZ:     00092 (00146) (00239)
HS:         00001 (00013) (00212) (00220)
MS:         00000 (00014)
MSS:        00000 (00015) (00209) (00231) (00232)
NOUTS:      00F16 (00016) (00208)
NSIZES:     000F5 (00017) (00219)
SAS100:     0044A (00022) (00155)
SAS101:     0044C (00023) (00154)
SAS11:      00398 (00019) (00157)
SAS38:      003CF (00020) (00156)
SAS39:      003D0 (00021)
SCLRS:      00001 (00144) (00152)
START:      07980 (00024) (00042)
SVTS:       00382 (00018) (00019) (00020) (00021) (00022) (00023)
VDINS:      0799B (00035) (00062)
VDINSSA:    00000 (00060) (00064) (00135)
VDINSSZ:    00039 (00061) (00135) (00136)
WS:         00002 (00025) (00225)
WWS:        00004 (00026)
X2S:        00800 (00027) (00158)
XSIZES:     000FF (00028) (00159)
YOMS:       00800 (00029) (00160) (00194) (00223)
```

```
PAGE    9:      FCH 252... "MPVDNP(Y,U,V)"      VAR.,DC,INTERPOLATE,FIX

  YSIZES:     00009 (00030) (00161) (00195) (00210) (00219) (00224)
  ZS:         00003 (00031)

LINES WITH ERRORS:    0  (MAP VERSION R00101.10)   E=    0
```

```
         00007A1D (00001)        *L=$7A1D
07A1D 7986        (00002)        DATA $7986                 CHANGE FROM ISA TO LOCAL
         00007A1F (00003)        *L=$7A1F
07A1F 7988        (00004)        DATA $7988
         00007986 (00005)        *L=$7986
07986 2000        (00006)        DATA $2000,$3D             2**-14
07987 003D
07988 1000        (00007)        DATA $1000,$3D             2**-15
07989 003D
0798A             (00008)        END
```

PAGE 2: #L=S7AID

LINES WITH ERRORS: 0 (MAP VERSION H00101.10) K= 0

```
                  (00001) * FCB 253... "MPBASP(Y,U,V,W)"    BASIS SPECTRUM CALCULATION
                  (00002) *                                 ORIGINATED:31-OCT-79
                  (00003) *                                 UPDATED:21-MAR-80
                  (00004) * DEFINE GLOBAL SYMBOLS
                  (00005)        OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                  (00006)        OPADD DOF, (3 .LS. 10) + (12 .LS. 5) + $1B
         000008E8 (00007)        AFDTSORG=$8E8
         000021FC (00008)        CSPUSNOS=$21FC
         00000794 (00009)        DMYS=$794
         00000003 (00010)        #M=3
         00000001 (00011)        H$=1
         00000000 (00012)        M$S=0
         00000382 (00013)        SVTS=$0382
         00000382 (00014)        SA$00=SVTS+2*D'00'
         00000386 (00015)        SA$02=SVTS+2*D'02'
         0000038E (00016)        SA$06=SVTS+2*D'06'
         0000039A (00017)        SA$12=SVTS+2*D'12'
         000003EE (00018)        SA$54=SVTS+2*D'54'
         000003FA (00019)        SA$60=SVTS+2*D'60'
         00000414 (00020)        SA$73=SVTS+2*D'73'
         0000041A (00021)        SA$76=SVTS+2*D'76'
         0000041C (00022)        SA$77=SVTS+2*D'77'
         00000420 (00023)        SA$79=SVTS+2*D'79'
         00000422 (00024)        SA$80=SVTS+2*D'80'
         00007B90 (00025)        START=$7B90
         00000002 (00026)        W$=2
         00000004 (00027)        WW$=4
         00000003 (00028)        Z$=3
         00000007 (00029)        ZZH$=7
                  (00030) *
                  (00031) * EXPAND ARRAY FUNCTION DISPATCH TABLE
         00000BD6 (00032)        *L=AFDTSORG+3*2*(253-128)               FCB 253
00BD6    001E7BA6 (00033)        ADDR BASS(R7,1)
00BD8    001E7CB6 (00034)        ADDR G204S(R7,1)
00BDA    001021FC (00035)        ADDR CSPUSNOS(,1,0)
                  (00036)        EJECT
```

```
                    (00037) *
                    (00038) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00039) *
          00007B90  (00040)         #L=START
                    (00041)         EVEN
                    (00042) *  SPECIAL CONSTANTS FOR EXPONENTIATION
07B90 2000003B (00043) TABLES  DATA 2.3841859E-07                        2**(-22)
07B92 40000044 (00044)         DATA 3.2768000E+04                        2**15
07B94 0820003D (00045)         DATA 1.5497208E-05                        4*65*16**(-6)
07B96 3DB6415C (00046)         DATA 0.24957274BE+34                      C5
07B98 12690007 (00047)         DATA 0.71220889 7E+27                     C4
07B9A 725511D1 (00048)         DATA 0.263632333E+21                      C3
07B9C 1F8D5ACC (00049)         DATA 0.675972338E+14                      C2
07B9E 8800003B (00050) TABLES2 DATA -5.9604646E-08                       -16**(-6)
07BA0 58B93D46 (00051)         DATA 0.116291788E+08                      C1
07BA2 7FFFFF40 (00052)         DATA 0.9999999250                         C0
               (00053)         EJECT
```

```
                        (00054) *
                        (00055) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00056) *
                        (00057)         EVEN
      07BA4 0000        (00058)         DATA BASSSA                                START ADDRESS
      07BA5 0084        (00059)         DATA BASSSZ                                MODULE SIZE
                        (00060) BASS    BEGIN APU(BAS)
            00000000    (00061)         #A=0
                        (00062) *
                        (00063) *  PHASE 1 FINDS THE PRODUCT OF THE SQUARED MAGNITUDES OF TWO
                        (00064) *  COMPLEX BUFFERS, MULTIPLIES THESE PRODUCTS BY A SCALE FACTOR
                        (00065) *  G, WHICH IS SB (=ENG)/SA^2 (=EGR^2).  THE TWO COMPLEX BUFFERS
                        (00066) *  MUST BE CONTIGUOUS IN MEMORY.  W IS A DOUBLE LENGTH BUFFER
                        (00067) *  CONTAINING BOTH. (IN THE COMMENTS, W REFERS TO 1ST HALF,
                        (00068) *  V TO 2ND HALF). THE RECIPROCAL IF MAG-SQD (W) IS USED TO FORM
                        (00069) *  THE PRODUCT.  U IS THE OUTPUT BUFFER, WHICH GETS THE
                        (00070) *  PRODUCTS.  SC IS AN OUTPUT SCALAR, 1.0/SA (=EGR')
                        (00071) *  WR(0) IS TAKEN TO BE 2**12
                        (00072) *  EQ:  Y(N)=(ENG/W^2(N))*(V^2(N)/EGR^2)
                        (00073) *
                        (00074) *
A00 07BA6 16A00000      (00075) BASSSA  K(2)\NOP                                   FIND 1/SA (=1/EGR),DO IT
A01 07BA8 08D00000      (00076)         MOV(IO,A0)\NOP                             EGR.
A02 07BAA 2F162F16      (00077)         MOV(A6),RCP(A0)                            2;1./E' (=F0)
A03 07BAC 08FF0000      (00078)         MOV(IOA,M6)\NOP                            EGR (=C)
A04 07BAE 08B808B8      (00079)         MOV(R,M0)                                  1./E' (=F0)
A05 07BB0 84408440      (00080)         MUL(M0,M6)                                 E/E' (=F0*C)
A06 07BB2 08B108B1      (00081)         MOV(P,A1)                                  F0*C
A07 07BB4 49C049C0      (00082)         SUB(A6,A1)                                 2-F0*C
A08 07BB6 08BC08BC      (00083)         MOV(R,M4)                                  2-F0*C
A09 07BB8 84008400      (00084)         MUL(M0,M4)                                 F0(2-F0*C) (=F1)
A0A 07BBA 08AB08AB      (00085)         MOV(P,M0)                                  F1
A0B 07BBC 84408440      (00086)         MUL(M0,M6)                                 F1*C
A0C 07BBE 08EF0000      (00087)         MOV(IOA,M7)\NOP                            SB (=ENG)
A0D 07BC0 08B108B1      (00088)         MOV(P,A1)                                  F1*C
A0E 07BC2 49C049C0      (00089)         SUB(A6,A1)                                 2-F1*C
A0F 07BC4 08BC08BC      (00090)         MOV(R,M4)                                  2-F1*C
A10 07BC6 84008400      (00091)         MUL(M0,M4)                                 F1(2-F1*C)
A11 07BC8 08AB08AB      (00092)         MOV(P,M3)                                  1.0/SA
A12 07BCA 08AD08AD      (00093)         MOV(P,M5)
A13 07BCC 85BC85A0      (00094)         MOV(O0),MUL(M3,M5)\MUL(M3,M5)              OUTPUT EGR';1.0/EGR^25
A14 07BCE 08C80000      (00095)         MOV(IO,M0)\NOP                             VR(0)
A15 07BD0 08FC0000      (00096)         MOV(IOA,M4)\NOP                            VR(0)
A16 07BD2 08AB08AB      (00097)         MOV(P,M3)                                  1.0/EGR^2
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A17 07BD4 85F085F0          MUL(M3,M7)                              ENG/FGR^2 (=A)
A18 07BD6 08AF08AF          MOV(P,M7)
                    *
                    *  LOOP FOR N=0,1,2,...Z+2
A19 07BD8 841884B0  MLP     MOV(EXO),MUL(M0,M4)\MOV(A0),MUL(M1,M5)  V(N-2)^2;VR(N)^2\WR(N-1)
                    ;                                               ^2;WI(N-1)^2
A1A 07BDA 08C9084A          MOV(IQ,M1)\MOV(EX1,M2)                  VI(N)\V(N-2)^2*A
A1B 07BDC 08FD089C          MOV(IQA,M5)\MOV(R,OO)                   VI(N)\L(N-3) OUT
A1C 07BDF 08BA08C8          MOV(R,M2)\MOV(IQ,M0)                    V(N-1)^2\WR(N)
A1D 07BE0 000008FC          NOP\MOV(IQA,M4)                         WR(N)
A1E 07BE2 84808571          MOV(A0),MUL(M1,M5)\MOV(A1),MUL(M2,M7)   VR(N)^2;VI(N)^2\WI(N-1)^
                    ;                                               2;V(N-2)^2*A*W'(N-2)^2
A1F 07BE4 00004100          NOP\ADD(A0,A1)                          W(N-1)^2
A20 07BE6 000008C9          NOP\MOV(IQ,M1)                          WI(N)
A21 07BE8 000008FD          NOP\MOV(IQA,M5)                         WI(N)
A22 07BEA 08C80000          MOV(IQ,M0)\NOP                          VR(N+1)
A23 07BEC 08FC2F52          MOV(IQA,M4)\MOV(A2),RCP(A2)             VR(N+1)\W(N-1)^2;W'(N-1)
                    ;                                               ^2
A24 07BEE 85718413          MOV(A1),MUL(M2,M7)\MOV(A3),MUL(M0,M4)   VI(N)^2;V(N-1)^2*A\M(N-2
                    ;                                               );WR(N)^2
A25 07BF0 41000F6F          ADD(A0,A1)\MOV(M7),LGS(A3)              V(N)^2\W'(N-1)^2;L(N-2)
A26 07BF2 90160019          JUMPC(MLP,FWI)
A27 07BF4 20372037          CLEAR(WI)
A28 07BF6 00000000          NOP
                    *
                    *  TMP2(I)=0.5*LOG2(DCT1(I)')=LOG2(SQRT(DCT1(I)')
                    *NOW DO LOG REFORMATTING
                    *  PICK UP TWO FAKE LOGS AT A TIME,MANTISSA AND EXPONENT
                    *  SEPARATELY.
A29 07BF8 16801680          K(1)
A2A 07BFA 08FD08FD          MOV(IQA,M5)                             KD=2 (1/2 *LOG2(16))
A2B 07BFC 16F01604          K(8)\MOV(A4),K(4)                       STORE 1.0
A2C 07BFE 08F00000          MOV(IQA,A0)\NOP                         M0
A2D 07C00 000008F0          NOP\MOV(IQA,A0)                         M1
A2E 07C02 22852285          MOV(A5),INCRE(A5)                       GET 128.\64.
A2F 07C04 08FC4595          MOV(IQA,M4)\MOV(A5),ADD(A4,A5)          E0\GET 65.
A30 07C06 000008FC          NOP\MOV(IQA,M4)                         E1
A31 07C08 08980898          MOV(R,EXO)\MOV(R,EXO)                   GET 128,65 ON BOTH SIDES
A32 07C0A 08880896          MOV(R,M0)\MOV(R,A6)                     128.\65.
A33 07C0C 08560848          MOV(EXI,A6)\MOV(EXI,M0)                 65.\128.
A34 07C0E 84008400          ABSMUL(M0,M4)                           128.*E0\128.*E1
A35 07C10 4F004F00          SUB(A0,A6)                              M0-65\M1-65
A36 07C12 08910891          MOV(R,A1)                               M0-65\M1-65
A37 07C14 08F00808          MOV(IQA,A0)\MOV(ZERO,M3)                M2
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A38 07C16 08080BF0 (00142)          MOV(ZERO,M3)\MOV(IOA,A0)             M3
A39 07C18 08B20BB2 (00143)          MOV(P,A2)                            128*E0\128*E1
A3A 07C1A 08FC0B15 (00144)          MOV(IOA,M4)\MOV(ZERO,A5)             E2
A3B 07C1C 0B150BFC (00145)          MOV(ZERO,A5)\MOV(IOA,M4)             E3
A3C 07C1E 85808580 (00146)          MUL(M3,M4)                           GET 0 IN P
A3D 07C20 42204220 (00147)          ADD(A1,A2)                           M0-65+128E0\SAME FOR M1,
                   (00148) ;                                             F1
                   (00149) *  NOW LOOP FOR N=0,2,...YZ/2
A3E 07C22 08B40BB4 (00150) LP:      MOV(P,A4)                            STORE A*L(N-2(N-1))
A3F 07C24 841C841C (00151)          MOV(OO),ABSMUL(M0,M4)                OUTPUT A*L(N-2);128*(F(N
                   (00152) ;                                             +2)\E(N+3))
A40 07C26 4F094F09 (00153)          MOV(M1),SUB(A0,A6)                   L(N(N+1));M(N+2(3))-65
A41 07C28 08F00891 (00154)          MOV(IOA,A0)\MOV(R,A1)                M(N+4)\M(N+3)-65
A42 07C2A 45914591 (00155)          MOV(A1),ADD(A4,A5)                   M(N)-65;SUM+A*L(N-2)\M(N
                   (00156) ;                                             +1)-65;SUM+A*L(N-1)
A43 07C2C 00000BF0 (00157)          NOP\MOV(IOA,A0)                      M(N+5)
A44 07C2E 84B284B2 (00158)          MOV(A2),MUL(M1,M5)                   128*E(N+2(N+3));L(N(N+1)
                   (00159) ;                                             )*SD
A45 07C30 42354235 (00160)          MOV(A5),ADD(A1,A2)                   STORE SUM;M(N+2)-65+128*
                   (00161) ;                                             E(N+2)\(N+3)
A46 07C32 08FC0000 (00162)          MOV(IOA,M4)\NOP                      E(N+4)
A47 07C34 00000BEC (00163)          NOP\MOV(IOA,M4)                      E(N+5)
A48 07C36 00000000 (00164)          NOP                                  BE SAFE?
A49 07C38 9016003F (00165)          JUMPC(LP,FW1)                        ENOUGH?
A4A 07C3A 20372037 (00166)          CLEAR(W1)
A4B 07C3C 00000000 (00167)          NOP
A4C 07C3E 000002A0 (00168)          NOP\R(A5)                            ODD SUM
A4D 07C40 08F40000 (00169)          MOV(IOA,A4)\NOP                      BTLTH
A4E 07C42 4D800B98 (00170)          SUB(A4,A5)\MOV(R,FX0)                BTLTH-EVEN SUM\ODD SUM
A4F 07C44 08530000 (00171)          MOV(FX1,A3)\NOP                      ODDSUM
A50 07C46 4BB50000 (00172)          MOV(A5),SUB(A5,A3)\NOP               BTLTH-EVEN-ODD
A51 07C48 08F80000 (00173)          MOV(IOA,M0)\NOP                      1./LTH
A52 07C4A 08BC0000 (00174)          MOV(R,M4)\NOP                        BTLTH-SUM
A53 07C4C 84008400 (00175)          MUL(M0,M4)                           (BTLTH-SUM)/LTH
A54 07C4E 08BC0000 (00176)          MOV(P,OO)\NOP                        OUTPUT IT (CTEMP)
                   (00177) *
                   (00178) *
                   (00179) *  DCT1(I)''=2,0**TMP2(I)=SQRT(DCT1(I)*PWEIT(I))
A55 07C50 08EB0BEB (00180) EXPS     MOV(IOA,M3)                          M3=SA TEMPORARILY
A56 07C52 08FC0BFC (00181)          MOV(IOA,M4)                          M4=2**(-22) TEMPORARILY
A57 07C54 85808580 (00182)          MUL(M3,M4)
A58 07C56 08FD0BFD (00183)          MOV(IOA,M5)                          M5=2**(15)
A59 07C58 08F40BF4 (00184)          MOV(IOA,A4)                          A4=4*65*16**(-6)
A5A 07C5A 08E90BE9 (00185)          MOV(IOA,M1)                          M1=C5
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A5B 07C5C 0BF70BF7 (00186)          MOV(IOA,A7)                  A7=C4
A5C 07C5E 0BF60BF6 (00187)          MOV(IOA,A6)                  A6=C3
A5D 07C60 0BF50BF5 (00188)          MOV(IOA,A5)                  A5=C2
A5E 07C62 0BAC0BAC (00189)          MOV(P,M4)                    M4=SA*2**(-22)
A5F 07C64 0BFA0000 (00190) #1       MOV(IOA,M2)\NOP              M2=X(0,K)
A60 07C66 00000BFA (00191)          NOP\MOV(IOA,M2)
A61 07C68 851C851C (00192)          MOV(D0),MUL(M2,M4)           D0=X(19,K-2),X(1,K)
A62 07C6A 3A6B3A6B (00193)          MOV(M3),ALIGN(A3)            A3=X(9,K-1),X(7,K-1)
A63 07C6C 1F731F73 (00194)          MOV(A3),EXP(A3)              A3=X(7,K-1),X(10,K-1)
A64 07C6E 85D185D1 (00195)          MOV(A1),MUL(M3,M6)           A1=X(1,K),X(11,K-1)
A65 07C70 3A2B3A2B (00196)          MOV(M0),ALIGN(A1)            M0=X(10,K-1),X(2,K)
A66 07C72 32523252 (00197)          MOV(A2),NORM(A2)             A2=X(2,K),X(3A,K)
A67 07C74 0BB30BB3 (00198)          MOV(P,A3)                    A3=X(11,K-1)
A68 07C76 46704670 (00199)          MOV(A0),ADD(A3,A6)           A0=X(3A,K),X(12,K-1)
A69 07C78 022B022B (00200)          MOV(M3),R(A1)                M3=X(12,K-1),SET T BIT B
                   (00201) ;                                     Y X(3A,K)
A6A 07C7A 85C085C0 (00202)          MUL(M3,M6)                   X(13,K-1)
A6B 07C7C 0BF20BF2 (00203)          MOV(IOA,A2)                  A2=-16**(-6)
A6C 07C7E 5A005A00 (00204)          ADDLT(A0,A2)                 X(3B,K)
A6D 07C80 0BB30BB3 (00205)          MOV(P,A3)                    A3=X(13,K-1)
A6E 07C82 45704570 (00206)          MOV(A0),ADD(A3,A5)           A0=X(3B,K),X(14,K-1)
A6F 07C84 440B440B (00207)          MOV(M3),ADD(A0,A4)           M3=X(A4,K-1),X(4,K)
A70 07C86 85C085C0 (00208)          MUL(M3,M6)                   X(15,K-1)
A71 07C88 0BF20BF2 (00209)          MOV(IOA,A2)                  A2=C1
A72 07C8A 0B8A0B8A (00210)          MOV(R,M2)                    M2=X(4,K)
A73 07C8C 8533B533 (00211)          MOV(A3),MUL(M2,M5)           A3=X(15,K-1),X(5,K)
A74 07C8E 43404340 (00212)          ADD(A2,A3)                   X(16,K-1)
A75 07C90 4B2B4B2B (00213)          MOV(M3),SUB(A1,A0)           M3=X(16,K-1),X(6,K)
A76 07C92 85D385D3 (00214)          MOV(A3),MUL(M3,M6)           A3=X(5,K),X(17,K-1)
A77 07C94 0BF20BF2 (00215)          MOV(IOA,A2)                  A2=C0
A78 07C96 0B800B80 (00216)          MOV(R,NULL)
A79 07C98 0BB10BB1 (00217)          MOV(P,A1)                    A1=X(17,K-1)
A7A 07C9A 0B8E0B8E (00218)          MOV(R,M6)                    M6=X(6,K)
A7B 07C9C 84C084C0 (00219)          MUL(M1,M6)                   X(8,K)
A7C 07C9E 42204220 (00220)          ADD(A1,A2)                   X(18,K-1)
A7D 07CA0 0B8F0B8F (00221)          MOV(R,M7)                    M7=X(18,K-1)
A7E 07CA2 84718471 (00222)          MOV(A1),MUL(M0,M7)           A1=X(8,K),X(19,K-1)
A7F 07CA4 47204720 (00223)          ADD(A1,A7)                   X(9,K)
A80 07CA6 901C005F (00224)          JUMPC(#1,F0)                 FOR I=0,1,2...LTH-1
                   (00225) *
AB1 07CA8 20320000 (00226) DNFSA    CLEAR(RA)\NOP                APU DONE!
AB2 07CAA 00000000 (00227)          NOP
AB3 07CAC 10000000 (00228)          JUMP(0)
          00000084 (00229)          BASSSZ=$A-BASSSA
```

```
07CAF          (00230)        END BASSSZ
               (00231)        EJECT
```

```
                    (00232) *
                    (00233) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00234) *
                    (00235)          EVEN
    07CAF 00007D9A  (00236)          ADDR G204SI                        POINTER TO CONSTRUCTED I
                    (00237) ;                                           NSTRUCTION BLOCK
    07CB0 00007CB6  (00238)          ADDR G204S                         POINTER TO SCALAR BLOCK
    07CB2 0000      (00239)          DATA 0                             NUMBER OF SCALARS
    07CB3 00F2      (00240)          DATA G204SZ                        MODULE SIZE
    07CB4 00007DB6  (00241)          ADDR G204SA                        POINTER TO CHAIN ANCHOR
                    (00242)          EVEN                               END ON WORD BOUNDARY
                    (00243) *
                    (00244) G204S    BEGIN APS(G204)
A00 07CB6 00204D40  (00245)          JSN(G204S0,P2)                     SET OUTPUT PC(P2)
A01 07CB8 02300030  (00246)          SET(RO)                            ENABLE OUTPUT ADDRESSING
A02 07CBA 04C20414  (00247)          LOAD(BRO,SAS73(1),TF)              EGR
A03 07CBC 06C203FA  (00248)          LOAD(BRO,SAS60(1),TF)              ENG
A04 07CBE 08403000  (00249)          LOAD(BRO,[3])                      WRO = WBASE
A05 07CC0 0A600000  (00250)          LOAD(BR2,MSS)                      VZ-1
A06 07CC2 0C700000  (00251)          LOAD(BR3,MSS)                      DUMMY, SPACING MUST BE 4
A07 07CC4 0E390011  (00252)          MOVB(BR3,BRO)                      NEED BASE FOR V START
A08 07CC6 1039002D  (00253)          ADDB(BR3,BR2)
A09 07CC8 1239002D  (00254)          ADDB(BR3,BR2)                      VR(0)-2
A0A 07CCA 14190017  (00255)          MOVB(BR1,BR3)                      VR(0)-2
A0B 07CCC 169A0002  (00256)          ADD(BR1,2,TF)                      VR(0)
A0C 07CCE 181A0002  (00257)          ADD(BR1,2)                         SKIP VI(0)
A0D 07CD0 1AF203B2  (00258)          LOAD(BR3,SAS00(1),TF)              VI0 = 0
A0E 07CD2 1CF2039A  (00259)          LOAD(BR3,SAS12(1),TF)              WRO = 2**12
A0F 07CD4 1EF203B2  (00260)          LOAD(BR3,SAS00(1),TF)              WI0 = 0
A10 07CD6 200A0002  (00261)          ADD(BRO,2)                         POINT TO WI0
A11 07CD8 22290032  (00262)          SUBL(BR2,2)                        VZ-3
                    (00263) *  LOOP FOR N = 1,2,3,...,VZ/2-1
A12 07CDA 249A0002  (00264) #1       ADD(BR1,2,TF)                      VR(N)
A13 07CDC 269A0002  (00265)          ADD(BR1,2,TF)                      VI(N)
A14 07CDE 288A0002  (00266)          ADD(BRO,2,TF)                      WR(N)
A15 07CE0 2A8A0002  (00267)          ADD(BRO,2,TF)                      WI(N)
A16 07CE2 2C2912B2  (00268)          SUBL(BR2,2),JUMPP(#1)
A17 07CE4 2E60000A  (00269)          LOAD(BR2,10)                       NEED 13 DUMMIES TOTAL
A18 07CE6 30C20794  (00270)          LOAD(BRO,DMYS(1),TF)
A19 07CE8 32890011  (00271) #2       MOVB(BRO,BRO,TF)
A1A 07CEA 34291981  (00272)          SUBL(BR2,1),JUMPP(#2)
A1B 07CEC 36890011  (00273)          MOVB(BRO,BRO,TF)                   ONE MORE MAKES 9
A1C 07CEE 38390037  (00274)          SET(W1)
A1D 07CF0 3A000020  (00275)          NOP(0)
```

```
                        (00276) *
                        (00277) *CHANGE FORMAT OF LOGS
A1E 07CF2 3CC20386 (00278)          LOAD(BR0,SAS02(1),TF)        1/2 * LOG2(16) = 2
A1F 07CF4 3E401036 (00279)          LOAD(BR0,(1))
A20 07CF6 40500000 (00280)          LOAD(BR1,MSS)                PWEIT Z-1
A21 07CF8 42600000 (00281)          LOAD(BR2,MSS)                DUMMY
A22 07CFA 44681006 (00282)          LOAD(BR2,(1),S)              NEED TO ADDRESS IT AS SH
                        (00283) ;                                ORT, TOO
A23 07CFC 46700000 (00284)          LOAD(BR3,MSS)                DUMMY
A24 07CFE 48700000 (00285)          LOAD(BR3,MSS)                DUMMY
A25 07D00 4A090032 (00286)          SUBL(BR0,2)                  UBASE -2
A26 07D02 4C290031 (00287)          SUBL(BR2,1)                  U-1
A27 07D04 4E190031 (00288)          SUBL(BR1,1)                  UZ-2
                        (00289) *  LOOP FOR N = 0,2,...UZ-2
A28 07D06 510A0002 (00290) #3       ADD(BR0,2,TF)                M(N)
A29 07D08 530A0002 (00291)          ADD(BR0,2,TF)                M(N+1)
A2A 07D0A 55AA0002 (00292)          ADD(BR2,2,TO)                E(N)
A2B 07D0C 57AA0002 (00293)          ADD(BR2,2,TO)                E(N+1)
A2C 07D0E 5B192BB2 (00294)          SUBL(BR1,2),JUMPP(#3)
A2D 07D10 5A500004 (00295)          LOAD(BR1,4)                  SIX PAIRS OF DUMMIES (10
                        (00296) ;                                +2)
A2E 07D12 5D090011 (00297) #4       MOVB(BR0,BR0,TF)             "M" AND "E"
A2F 07D14 5F090011 (00298)          MOVB(BR0,BR0,TF)
A30 07D16 60192FB1 (00299)          SUBL(BR1,1),JUMPP(#4)
A31 07D18 63090011 (00300)          MOVB(BR0,BR0,TF)
A32 07D1A 65090011 (00301)          MOVB(BR0,BR0,TF)
A33 07D1C 66300037 (00302)          SET(W1)                      WAIT FOR APU
A34 07D1E 68000020 (00303)          NOP(0)
A35 07D20 6AC20420 (00304)          LOAD(BR0,SAS79(1),TF)        RTLTH
A36 07D22 6CC203FE (00305)          LOAD(BR0,SAS54(1),TF)        1/LTH
                        (00306) *
A37 07D24 6ED203BE (00307) EXPS1    LOAD(BR1,SAS06(1),TF)        IQ=0.25
A38 07D26 70D27B90 (00308)          LOAD(BR1,TABLES(1),TF)       IQ=2**(-22)
A39 07D28 72600005 (00309)          LOAD(BR2,5)                  IQ=2**15,4*65*16**(-6)
A3A 07D2A 749A0002 (00310) #1       ADD(BR1,WS,TF)               C5,C4,C3,C2
A3B 07D2C 76293AB1 (00311)          SUBL(BR2,1),JUMPP(#1)        6 CONSTANTS TOTAL!
A3C 07D2E 78402034 (00312)          LOAD(BR0,(2))                TMP2(,) BA
A3D 07D30 7A700000 (00313)          LOAD(BR3,MSS)                TMP2(,) SIZE-1
A3E 07D32 7C020000 (00314)          SUB(BR0,MSS)                 TMP2(,) BA-2
A3F 07D34 7E8A0002 (00315) #2       ADD(BR0,WS,TF)               IQ=TMP2(I)
A40 07D36 808A0002 (00316)          ADD(BR?,WS,TF)               IQ=TMP2(I+1)
A41 07D38 829A0002 (00317)          ADD(BR1,WS,TF)               IQ=-16**(-6)
A42 07D3A 849A0002 (00318)          ADD(BR1,WS,TF)               IQ=C1
A43 07D3C 869A0002 (00319)          ADD(BR1,WS,TF)               IQ=C0
```

```
A44 07D3E BB190036 (00320)          SUBL(BR1,6)                  -16**(-6) BA
A45 07D40 BA393EB2 (00321)          SUBL(BR3,2),JUMPP(#2)        FOR I=0,1,2...LTH-1
A46 07D42 BCC20794 (00322)          LOAD(BR0,DMYS(1),TF)         IQ=?
A47 07D44 BEC20794 (00323)          LOAD(BR0,DMYS(1),TF)         IQ=?
A48 07D46 909A0002 (00324)          ADD(BR1,WS,TF)               IQ=-16**(-6)
A49 07D48 929A0002 (00325)          ADD(BR1,WS,TF)               IQ=C1
A4A 07D4A 949A0002 (00326)          ADD(BR1,WS,TF)               IQ=C0
                   (00327) *
A4B 07D4C 96200031 (00328) DNESI    CLEAR(RI)                    INPUT DONE!
A4C 07D4E 98000020 (00329)          NOP
                   (00330) *
A4D 07D50 9A300032 (00331) G204SO   SET(RA)                      ENABLE APU
A4E 07D52 9CE20414 (00332)          LOAD(BW3,SAS73(1),TF)        EGR' = 1/EGR
A4F 07D54 9EC20794 (00333)          LOAD(BW0,DMYS(1),TF)         NEED 3 DUMMIES OUT
A50 07D56 A0810010 (00334)          MOVB(BW0,BW0,TF)
A51 07D58 A2810010 (00335) #3       MOVB(BW0,BW0,TF)
A52 07D5A A4C0102C (00336)          LOAD(BW0,(1),TF)             U(0)
A53 07D5C A6500000 (00337)          LOAD(BW1,MSS)                UZ-1
A54 07D5E A8600000 (00338)          LOAD(BW2,MSS)                DUMMY, SPACING MUST BE 2
A55 07D60 AABA0002 (00339)          ADD(BW0,2,TF)                U(1)
A56 07D62 AC110032 (00340)          SUBL(BW1,2)
                   (00341) *  LOOP FOR N = 2,4,...UZ-2
A57 07D64 AEBA0002 (00342) #5       ADD(BW0,2,TF)                U(N)
A58 07D66 B0BA0002 (00343)          ADD(BW0,2,TF)                U(N+1)
A59 07D68 B21157B2 (00344)          SUBL(BW1,2),JUMPP(#5)
                   (00345) *
                   (00346) *  OUTPUT FLT PT LOGS
A5A 07D6A B4C20794 (00347)          LOAD(BW0,DMYS(1),TF)
A5B 07D6C B6810010 (00348)          MOVB(BW0,BW0,TF)             2 DUMMIES
A5C 07D6E B8C02014 (00349)          LOAD(BW0,(2),TF)             TMP2(0)
A5D 07D70 BA500000 (00350)          LOAD(BW1,MSS)                YZ-1
A5E 07D72 BC600000 (00351)          LOAD(BW2,MSS)                DUMMY
A5F 07D74 BEBA0002 (00352)          ADD(BW0,2,TF)                Y(1)
A60 07D76 C0110032 (00353)          SUBL(BW1,2)
                   (00354) *  LOOP FOR N=2,3,...YZ-2
A61 07D78 C2BA0002 (00355) #6       ADD(BW0,2,TF)                Y(N)
A62 07D7A C4BA0002 (00356)          ADD(BW0,2,TF)                Y(N+1)
A63 07D7C C61161B2 (00357)          SUBL(BW1,2),JUMPP(#6)
A64 07D7E C8C20422 (00358)          LOAD(BW0,SASB0(1),TF)        NORMALIZED SUM OF LOGS
                   (00359) *
A65 07D80 CAC20794 (00360) EXPSO    LOAD(BW0,DMYS(1),TF)         OQ=?
A66 07D82 CCC20794 (00361)          LOAD(BW0,DMYS(1),T.)         OQ=?
A67 07D84 CEC20794 (00362)          LOAD(BW0,DMYS(1),TF)         OQ=?
A68 07D86 D0C0001B (00363)          LOAD(BW0,(0),TF)             DCTM1(.) BA,OQ=DCTM1(0)
```

```
A69 07D88 E2700000 (00364)          LOAD(BW3,MSS)                      DCTM1(.) SIZE-1
A6A 07D8A E4026000 (00365)          SUB(BW0,MSS)                       DCTM1(.) BA-2
A6B 07D8C E6BA0002 (00366) #1       ADD(BW0,WS,TF)                     DO=DCTM1(I)
A6C 07D8E D8BA0002 (00367)          ADD(BW0,WS,TF)                     DO=DCTM1(I+1)
A6D 07D90 DABA0002 (00368)          ADD(BW0,WS,TF)                     DO=DCTM1(I+2)
A6E 07D92 DCBA0002 (00369)          ADD(BW0,WS,TF)                     DO=DCTM1(I+3)
A6F 07D94 FE316884 (00370)          SUBL(BW3,4),JUMPP(#1)              FOR I=1,2...LTH-1
                   (00371) *
A70 07D96 F0200030 (00372) DNESU    CLEAR(PO)                          OUTPUT DONE!
A71 07D98 F2000020 (00373)          NOP
                   (00374) *
          00007D86 (00375)          G204SA= #C                         ASSIGN VALUE TO CHAIN AN
                   (00376) ;                                           CHOR
    07D9A          (00377)          END #A-1
                   (00378) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    07D9A 00000000 (00379) G204S!   DATA 7F'0,0'
     ...
          000000F2 (00380)          G204SZ=#L-G204S
    07DAB          (00381)          END
```

```
AFDTSORG:  008E8 (00007) (00032)
BASS:      07BA6 (00033) (00060)
BASSSA:    00000 (00058) (00075) (00229)
BASSSZ:    00084 (00059) (00229) (00230)
CSPUSNOS:  021FC (00008) (00035)
DMYS:      00794 (00009) (00270) (00322) (00323) (00333) (00347) (00360) (00361) (00362)
DNFSA:     00081 (00226)
DNFSI:     00048 (00328)
DNFSO:     00070 (00372)
EXPS:      00055 (00180)
EXPSI:     00037 (00307)
EXPSO:     00065 (00360)
G204S:     07C86 (00034) (00238) (00244) (00380)
G204SA:    07D86 (00241) (00375)
G204SI:    07D9A (00236) (00379)
G204SO:    0004D (00245) (00331)
G204SZ:    000F2 (00240) (00380)
HS:        00001 (00011)
LP:        0003E (00150) (00165)
MSS:       00000 (00012) (00250) (00251) (00280) (00281) (00284) (00285) (00313) (00314) (00337)
                 (00338) (00350) (00351) (00364) (00365)
MLP:       00019 (00102) (00119)
SAS00:     00382 (00014) (00258) (00260)
SAS02:     00386 (00015) (00278)
SAS06:     0038E (00016) (00307)
SAS12:     0039A (00017) (00259)
SAS54:     003FF (00018) (00305)
SAS60:     003FA (00019) (00248)
SAS73:     00414 (00020) (00247) (00332)
SAS76:     0041A (00021)
SAS77:     0041C (00022)
SAS79:     00420 (00023) (00304)
SAS80:     00422 (00024) (00358)
START:     07B90 (00025) (00040)
SVTS:      00382 (00013) (00014) (00015) (00016) (00017) (00018) (00019) (00020) (00021) (00022)
                 (00023) (00024)
TABLES:    07B90 (00043) (00308)
TABLES2:   07B9E (00050)
WS:        00002 (00026) (00310) (00315) (00316) (00317) (00318) (00319) (00324) (00325) (00326)
                 (00366) (00367) (00368) (00369)
WWS:       00004 (00027)
ZS:        00003 (00028)
ZZHS:      00007 (00029)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E=    0
```

```
                    * FCB 254... "MPSCAN(Y,U,V)"      SCAN DCT BASIS SPECTRUM
                    *                                 ORIGINATED:02-NOV-79
                    *                                 UPDATED:25-MAY-80
                    * DEFINE GLOBAL SYMBOLS
                           OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                           OPADD DUE, (3 .LS. 10) + (12 .LS. 5) + $18
         000000BEB         AFDTSORG=$BEB
         0001FFC0          APSSMEM=$1FFC0
         000021FC          CSPUSNOS=$21FC
         00000794          DMYS=$794
         00000003          #M=3
         00000001          HS=1
         00000000          MSS=0
         00000382          SVTS=$0382
         0000039A          SAS12=SVTS+2*D'12'
         0000039C          SAS13=SVTS+2*D'13'
         00000420          SAS79=SVTS+2*D'79'
         00000422          SAS80=SVTS+2*D'80'
         00000426          SAS82=SVTS+2*D'82'
         00000428          SAS83=SVTS+2*D'83'
         0000042A          SAS84=SVTS+2*D'84'
         00007F10          START=$7F10
         000000FF          SIZES=D'256'-D'1'
         00000800          TMP1S=D'2048'
         00000A00          TMP2S=D'2560'
         00000002          WS=2
         00000004          WWS=4
         00000003          ZS=3
         00000007          ZZHS=7
                    *
                    * EXPAND ARRAY FUNCTION DISPATCH TABLE
         00000BDC          #L=AFDTSORG+3*2*(254-128)                       FCB 254
    00BDC 001F7F12         ADDR SCAS(R7,1)
    00BDF 001F7F24         ADDR G205S(R7,1)
    00BE0 001021FC         ADDR CSPUSNOS(,1,0)
                           EJECT
```

```
          (00037) *
          (00038) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
          (00039) *
          (00040)          EVEN
00007E10  (00041)          #L=START
          (00042)          EJECT
```

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                    (00043) *
                    (00044) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00045) *
                    (00046)          EVEN
    07F10 0000      (00047)          DATA SCASSA                                   START ADDRESS
    07F11 0085      (00048)          DATA SCASSZ                                   MODULE SIZE
                    (00049) SCAS     BEGIN APU(SCA)
          00000000  (00050)          #A=0
                    (00051) *  TMP2(I)=DCTM2(I)+CTEMP  I=0,1,2...ITOT
                    (00052) *  TMP2(I)=0 I>ITOT
A00 07F12 08F708F7  (00053) SCASSA   MOV(IOA,A7)                                   A7=CTEMP
A01 07F14 08130000  (00054)          MOV(ZERO,A3)\NOP                              A3=ITOT
A02 07F16 16801680  (00055)          R(1,0)                                        R=1,0
A03 07F18 08150815  (00056)          MOV(ZERO,A5)                                  A5=0.0
A04 07F1A 08910000  (00057)          MOV(R,A1)\NOP                                 A1=1.0
A05 07F1C 20282028  (00058)          CLEAR(AF0)                                    RESET "CANCEL ZERO FILL"
A06 07F1E 08F20000  (00059) VADDS    MOV(IOA,A2)\NOP                               A2=UE
A07 07F20 000008F2  (00060)          NOP\MOV(IOA,A2)                               A2=UO
A08 07F22 47404740  (00061)          ADD(A2,A7)                                    UE+CTEMP;UO+CTEMP
A09 07F24 08950895  (00062)          MOV(R,A5)                                     SET T1 & T2
A0A 07F26 911F001C  (00063)          JUMPS(VDNS1,T1)                               T1=1 FOR UE+CTEMP<0
A0B 07F28 02400000  (00064)          R(A2)\NOP                                     R=UE
A0C 07F2A 433C0000  (00065)          MOV(OO),ADD(A1,A3)\NOP                        UE=UE THEN ITOT+1
A0D 07F2C 911F0014  (00066)          JUMPS(VDNS2,T2)                               T2=1 FOR UO+CTEMP<0
A0E 07F2E 43330000  (00067)          MOV(A3),ADD(A1,A3)\NOP                        NO,THEN ITOT+1 AGAIN
A0F 07F30 08930000  (00068)          MOV(R,A3)\NOP                                 A3=ITOT+1
A10 07F32 00000240  (00069)          NOP\R(A2)                                     R=UO
A11 07F34 0000089C  (00070)          NOP\MOV(R,OO)                                 UO=UO
A12 07F36 90160006  (00071)          JUMPC(VADDS,FW1)                              LOOP FOR I=1,2...LTH-1
A13 07F38 20482048  (00072)          SET(AF0)                                      ADJUST FOR I=LTH-1
A14 07F3A 089302A0  (00073) VDNS2    MOV(R,A3)\R(A5)                               A3=ITOT+1;R=UO
A15 07F3C 00000898  (00074)          NOP\MOV(R,FXO)                                MOVE OVER
A16 07F3E 08550000  (00075)          MOV(FXI,A5)\NOP                               A5=UO(?)+CTEMP
A17 07F40 91080021  (00076)          JUMPS(VADDSDN,AF0)                            SET "CANCEL ZERO FILL" F
                    (00077) ;                                                      LAG
A18 07F42 081C0000  (00078) #2       MOV(ZERO,OO)\NOP                              UO(?)=0
A19 07F44 91160021  (00079)          JUMPS(VADDSDN,FW1)                            LAST SAMPLE?
A1A 07F46 08F00000  (00080)          MOV(IOA,NULL)\NOP                             NO,THROW AWAY NEXT ONE
A1B 07F48 10000018  (00081)          JUMP(#2)                                      THEN CLEAR SAME LOCATION
A1C 07F4A 081C081C  (00082) VDNS1    MOV(ZERO,OO)                                  U(?)=0.0
A1D 07F4C 91160021  (00083)          JUMPS(VADDSDN,FW1)                            LAST EVEN,ODD SAMPLES?
A1E 07F4E 08F00000  (00084)          MOV(IOA,NULL)\NOP                             NO, THEN THROW AWAY...
A1F 07F50 000008F0  (00085)          NOP\MOV(IOA,NULL)                             A PAIR @ A TIME
A20 07F52 1000001C  (00086)          JUMP(VDNS1)                                   THEN CLEAR SAME LOCATION
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                     (00087) ;                                                          S
A21 07F54 02A00000 (00088) VADDSUN R(A5)\NOP                                            A5=UE(2)+CTEMP
A22 07F56 089C0000 (00089)         MOV(R,00)\NOP                                        00=UE(2)+CTEMP
A23 07F58 02600000 (00090)         P(A3)\NOP                                            A3=ITOT
A24 07F5A 089C0000 (00091)         MOV(R,00)\NOP                                        00=ITOT
A25 07F5C 20372037 (00092)         CLEAR(WI)                                            RELEASE APS INPUT
                   (00093) *
                   (00094) *  ITOT'=1.0/ITOT
A26 07F5E 08BE0000 (00095) SINVS   MOV(R,M6)\NOP                                        M6=SC=ITOT
A27 07F60 08900000 (00096)         MOV(R,A0)\NOP                                        A0=ITOT
A28 07F62 16A016A0 (00097)         K(2)                                                 P=2.0;R=2.0
A29 07F64 08960000 (00098)         MOV(R,A6)\NOP                                        A6=2
A2A 07F66 2F000000 (00099)         RCP(A0)\NOP                                          R1=1/C+DEL(=F0)
A2B 07F68 08B80000 (00100)         MOV(R,M0)\NOP                                        M0=F0
A2C 07F6A 84400000 (00101)         MUL(M0,M6)\NOP                                       P1=F0*C
A2D 07F6C 08B10000 (00102)         MOV(P,A1)\NOP                                        A1=F0*C
A2E 07F6E 49C00000 (00103)         SUB(A6,A1)\NOP                                       R2=2-F0*C
A2F 07F70 08BC0000 (00104)         MOV(R,M4)\NOP                                        M4=R2
A30 07F72 84000000 (00105)         MUL(M0,M4)\NOP                                       P2=F0*R2(=F1)
A31 07F74 08A80000 (00106)         MOV(P,M0)\NOP                                        M0=F1
A32 07F76 84400000 (00107)         MUL(M0,M6)\NOP                                       P3=F1*C
A33 07F78 08B10000 (00108)         MOV(P,A1)\NOP                                        A1=P3
A34 07F7A 49C00000 (00109)         SUB(A6,A1)\NOP                                       R3=2-F1*C
A35 07F7C 08BC0000 (00110)         MOV(R,M4)\NOP                                        M4=R3
A36 07F7E 84000000 (00111)         MUL(M0,M4)\NOP                                       P4=F1*(2-F1*C)(=F2)
A37 07F80 08AF0000 (00112)         MOV(P,M7)\NOP                                        M7=1.0/ITOT
                   (00113) *
                   (00114) *  CTEMP=(BTLTH-SLOG)/ITOT
A38 07F82 08F60000 (00115) SSUMS   MOV(IOA,A6)\NOP                                      A6=BTLTH
A39 07F84 08100810 (00116)         MOV(ZERO,A0)                                         A0=0.0
A3A 07F86 02000200 (00117)         R(A0)                                                R=0.0
A3B 07F88 08F04717 (00118) #1      MOV(IOA,A0)\MOV(A7),ADD(A0,A7)                       A0=UE;A7=SUMO(-2),A7+UO(
                   (00119) ;                                                            -1)
A3C 07F8A 00000000 (00120)         NOP                                                  ?
A3D 07F8C 91160048 (00121)         JUMPS(S$2,FWI)
A3E 07F8E 47170BF1 (00122)         MOV(A7),ADD(A0,A7)\MOV(IOA,A1)                       A7=SUME(-1),A7+UE;A1=UO
A3F 07F90 00000000 (00123)         NOP                                                  ?
A40 07F92 91160049 (00124)         JUMPS(S$3,FWI)
A41 07F94 08F14737 (00125)         MOV(IOA,A1)\MOV(A7),ADD(A1,A7)                       A1=UE(+1);A7=SUMO(-1),A7
                   (00126) ;                                                            +SUMO
A42 07F96 00000000 (00127)         NOP                                                  ?
A43 07F98 9116004A (00128)         JUMPS(S$4,FWI)
A44 07F9A 47370BF0 (00129)         MOV(A7),ADD(A1,A7)\MOV(IOA,A0)                       A7=SUME,A7+UF(+1);A0=UO(
                   (00130) ;                                                            +1)
```

```
A45 07F9C 00000000 (00131)          NOP                                          ?
A46 07F9E 9016003B (00132)          JUMPC(B1,FWI)
A47 07FA0 08104717 (00133)          MOV(ZERO,A0)\MOV(A7),ADD(A0,A7)
A48 07FA2 47170811 (00134) SS2      MOV(A7),ADD(A0,A7)\MOV(ZERO,A1)
A49 07FA4 08114737 (00135) SS3      MOV(ZERO,A1)\MOV(A7),ADD(A1,A7)
A4A 07FA6 47370000 (00136) SS4      MOV(A7),ADD(A1,A7)\NOP
A4B 07FA8 08900898 (00137)          MOV(R,A0)\MOV(R,EXO)                         A0=SUME;EXO=SUMO
A4C 07FAA 08510000 (00138)          MOV(FXI,A1)\NOP                              A1=SUMO
A4D 07FAC 41004100 (00139)          ADD(A0,A1)                                   (SUME+SUMO)
A4E 07FAE 48D30000 (00140)          MOV(A3),SUB(A6,A3)\NOP                       A3=(SUME+SUMO),BTLTH-A3
A4F 07FB0 08880888 (00141)          MOV(R,M0)                                    M0=BTLTH-(SUME+SUMO)
A50 07FB2 84600000 (00142)          MUL(M0,M7)\NOP                               ITOT'*(BTLTH-(SUME+SUMO)
                   (00143) ;                                                     )
A51 07FB4 08BC0000 (00144)          MOV(P,DO)\NOP                                SA=CTEMP=(BTLTH-SLOG)/IT
                   (00145) ;                                                     OT
A52 07FB6 20372037 (00146)          CLEAR(WI)                                    RELEASE APS INPUT
                   (00147) *
                   (00148) *  TMP2(I)=TMP2(I)+CTEMP+0.5          I=0,1,2...LTH-1
A53 07FB8 16601660 (00149)          K(0.5)                                       R=.5
A54 07FBA 08880000 (00150)          MOV(P,EXO)\NOP                               EXO=CTEMP
A55 07FBC 08800850 (00151)          MOV(P,A0)\MOV(FXI,A0)                        A0=CTEMP
A56 07FBE 41110000 (00152)          MOV(A1),ADD(A0,A1)\NOP                       A1=0.5,CTEMP+0.5
A57 07FC0 47570000 (00153)          MOV(A7),ADD(A2,A7)\NOP                       A7=CTEMP+0.5, ADD FIRST
                   (00154) ;                                                     AND CONST.
A58 07FC2 08140000 (00155)          MOV(ZERO,A4)\NOP                             MIN
A59 07FC4 08F308F6 (00156)          MOV(IQA,A3)\MOV(IQA,A6)                      MAX\OLD SUM=MAX
A5A 07FC6 4F600000 (00157)          SUB(A3,A7)\NOP                               SUB CONST, SINCE WE ADD
                   (00158) ;                                                     IT LATER
A5B 07FC8 08920000 (00159)          MOV(R,A2)\NOP                                THIS IS NOW OLD VALUE
A5C 07FCA 08D30000 (00160) VADDS2   MOV(IQ,A3)\NOP                               A3=NEW
A5D 07FCC 4A600000 (00161)          SUB(A3,A2)\NOP                               NEW-OLD
A5E 07FCE 08F80000 (00162)          MOV(IQA,FXO)\NOP                             SAVE NEW
A5F 07FD0 476002C0 (00163)          ADD(A3,A7)\R(A6)                             NEW SUM\OLD SUM
A60 07FD2 901F006E (00164)          JUMPC(NOK,T1)                                JUMPIF NEW>OLD
A61 07FD4 64850000 (00165) OK       MOV(A5),MAX(A5,A4)\NOP                       NEWSUM,ZERO
A62 07FD6 00000858 (00166)          NOP\MOV(FXI,FXO)                             NEW INPUT
A63 07FD8 08520000 (00167)          MOV(FXI,A2)\NOP                              NEW INPUT
A64 07FDA 08980000 (00168)          MOV(R,EXO)\NOP                               OLD SUM <-- NEW SUM
A65 07FDC 911F006A (00169)          JUMPS(ZRO,T1)                                JUMPIF 0.GE.NEWSUM
A66 07FDE 089C0856 (00170)          MOV(R,DO)\MOV(FXI,A6)                        OUTPUT NEW SUM,OLDSUM <-
                   (00171) ;                                                     - NEWSUM
A67 07FE0 9016005C (00172)          JUMPC(VADDS2,FWI)                            LOOP
A68 07FE2 10000070 (00173)          JUMP(VADDS2E)
A69 07FE4 08F00000 (00174) ZEOLP    MOV(IQA,A0)\NOP                              DUMMY TO USE UP INPUT
```

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A6A 07FF6 081C0000 (00175) ZRO     MOV(ZERO,00)\NOP
A6B 07FF8 90160069 (00176)         JUMPC(ZROLP,FWI)                  KEEP GOING TIL INPUT DON
                   (00177) ;                                         E
A6C 07FFA 20372037 (00178)         CLEAR(WI)                         LET APS GO
A6D 07FFC 10000071 (00179)         JUMP(VINPTS)                      GO ON TO NEXT RTN
A6E 07FFE 0000089C (00180) NOK     NOP\MOV(R,00)                     OLD SUM OUT
A6F 07FF0 9016005C (00181)         JUMPC(VADDS2,FWI)                 LOOP
A70 07FF2 20372037 (00182) VADDS2F CLEAR(WI)                         RELEASE APS INPUT
                   (00183) *
                   (00184) *  TMP1(I)=INTEGER PART[TMP2(I)]   I=0,1,2...LTH-1
A71 07FF4 08FF08FF (00185) VINPTS  MOV(IQA,M7)                       M7=16**(6)
A72 07FF6 08FF08FF (00186)         MOV(IQA,M6)                       M6=16**(-6)
A73 07FF8 08170817 (00187)         MOV(ZERO,A7)                      A7=SA=0,0
A74 07FFA 08E80000 (00188)         MOV(IQA,M0)\NOP                   M0=X(0,I)
A75 07FFC 08F60000 (00189)         MOV(IQA,A6)\NOP                   A6=X(0,I-4)
A76 07FFF 000008F8 (00190)         NOP\MOV(IQA,M0)                   M0=X(0,I+1)
A77 07F00 000008F6 (00191)         NOP\MOV(IQA,A6)                   A6=X(0,I-3)
A78 07F02 84518451 (00192) #1      MOV(A1),MUL(M0,M6)                A1=X(4,I-2),P=X(1,I)
A79 07F04 02C902C9 (00193)         MOV(M1),R(A6)                     M1=X(3,I-1),T1=SIGN(X(0,
                   (00194) ;                                         I-1))
A7A 07F06 5F205F20 (00195)         MOV(NULL),ADDLT(A1,A7)            R=X(5,I-2)
A7B 07F08 84F084F0 (00196)         MOV(A0),MUL(M1,M7)                A0=X(1,I),P=X(4,I-1)
A7C 07F0A 3A1C3A1C (00197)         MOV(00),ALIGN(A0)                 00=X(5,I-2),R=X(2,I)
A7D 07F0C 08E80000 (00198)         MOV(IQA,M0)\NOP                   M0=X(0,I+2)
A7E 07F0E 08F60000 (00199)         MOV(IQA,A6)\NOP                   A6=X(0,I-2)
A7F 07F10 000008E8 (00200)         NOP\MOV(IQA,M0)                   X=(0,I+3)
A80 07F12 000008F6 (00201)         NOP\MOV(IQA,A6)                   X=(0,I-1)
A81 07F14 32103210 (00202)         MOV(A0),NORM(A0)                  A0=X(2,I),R=X(3,I)
A82 07F16 901C0078 (00203)         JUMPC(#1,F0)                      FOR I=0,1,2...LTH-1
                   (00204) *
A83 07F18 20320000 (00205) DNESA   CLEAR(RA)\NOP                     APU DONE!
A84 07F1A 00000000 (00206)         NOP
          00000085 (00207)         SCA$SZ=#A-SCA$SA
    07F1C          (00208)         END SCA$SZ
                   (00209)         EJECT
```

```
                         (00210) *
                         (00211) *>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                         (00212) *
                         (00213)          EVEN
     07F1C 00007FA2      (00214)          ADDR G205$I                          POINTER TO CONSTRUCTED I
                         (00215) ;                                             NSTRUCTION BLOCK
     07F1E 00007F28      (00216)          ADDR G205$+2*SCLR$                   POINTER TO SCALAR BLOCK
     07F20 0000          (00217)          DATA 0                               NUMBER OF SCALARS
     07F21 0080          (00218)          DATA G205$Z                          MODULE SIZE
     07F22 00007F2A      (00219)          ADDR G205$A                          POINTER TO CHAIN ANCHOR
                         (00220)          EVEN                                 END ON WORD BOUNDARY
                         (00221) *
                         (00222) G205$    BEGIN APS(G205)
A00  07F24 00102040      (00223)          JSN(G205$1,P1)                       SET INPUT PC(P1)
A01  07F26 02300030      (00224)          SET(RO)                              ENABLE OUTPUT ADDRESSING
A02  07F28 04F20422      (00225) SCLR$    LOAD(BR2,SAS80(1),TF)                IQ=CTEMP
A03  07F2A 06C00000      (00226)          LOAD(BR0,IO1,TF)                     IQ=DCTM2(0)
A04  07F2C 08500000      (00227)          LOAD(BR1,MSS)                        DCTM2(.) SIZE-1
A05  07F2E 0ABF0002      (00228)          ADD(BR0,WS,TF,C)                     IQ=DCTM2(1),CHANGE PC
                         (00229) *
A06  07F30 0CF20420      (00230) ISUM$S   LOAD(BR2,SAS79(1),TF)                IQ=BTLTH
A07  07F32 0FC60A00      (00231)          LOAD(BR0,TMP2S(3),TF)                IQ=TMP2(0)
A08  07F34 105000FF      (00232)          LOAD(BR1,SIZES)                      TMP2(.) SIZE-1
A09  07F36 128F0002      (00233)          ADD(BR0,WS,TF,C)                     IQ=TMP2(1),CHANGE PC
                         (00234) *
A0A  07F38 14E2042A      (00235) IADDS    LOAD(BR2,SAS84(1),TF)                IQ=5.0
A0B  07F3A 16C60A00      (00236)          LOAD(BR0,TMP2S(3),TF)                IQ=TMP2(0)
A0C  07F3C 185000FF      (00237)          LOAD(BR1,SIZES)                      TMP2(.) SIZE-1
A0D  07F3E 1ABF0002      (00238)          ADD(BR0,WS,TF,C)                     IQ=TMP2(1),CHANGE PC
                         (00239) *
A0E  07F40 1CF2039A      (00240) IINPTS   LOAD(BR2,SAS12(1),TF)                IQ=16**6
A0F  07F42 1EF2039C      (00241)          LOAD(BR2,SAS13(1),TF)                IQ=16**(-6)
A10  07F44 204609FE      (00242)          LOAD(BR0,TMP2S-2(3))                 TMP2(.) BA-2
A11  07F46 226609FF      (00243)          LOAD(BR2,TMP2S-2(3))                 TMP2(.) BA-2
A12  07F48 24700003      (00244)          LOAD(BR3,3)                          SET UP LOOP W/ ...
A13  07F4A 26BA0002      (00245) #1       ADD(BR0,WS,TF)                       IQ=TMP2(I)
A14  07F4C 28AA0000      (00246)          ADD(BR2,MSS,TF)                      IQ=TMP2(-1)
A15  07F4E 2A3913B1      (00247)          SUBL(BR3,1),JUMPP(#1)                FOR I=0,1,2,3
A16  07F50 2C5000FB      (00248)          LOAD(BR1,SIZES-4)                    TMP2(.) SIZE-1-4
A17  07F52 2EBA0002      (00249) INTPST   ADD(BR0,WS,TF)                       IQ=TMP2(I+4)
A18  07F54 30AA0002      (00250)          ADD(BR2,WS,TF)                       IQ=TMP2(I)
A19  07F56 321917B1      (00251)          SUBL(BR1,1),JUMPP(INTPST)            FOR I=0,1,2...LTH-6
A1A  07F58 34700005      (00252)          LOAD(BR3,5)                          SET UP LOOP W/ ...
A1B  07F5A 36BA6000      (00253) #2       ADD(BR0,MSS,TF)                      IQ=?
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A1C 07F5C 38AA0002 (00254)          ADD(BR2,WS,TF)                IQ=TMP2(LTH-4)
A1D 07F5E 3A391BB1 (00255)          SUBL(BR3,1),JUMPP(#2)         FOR I=0,1,...5
                   (00256) *
A1E 07F60 3C200031 (00257) DNES1    CLEAR(R1)                     INPUT DONE!
A1F 07F62 3E000020 (00258)          NOP
A20 07F64 40202740 (00259) G205$1   JSN(G205$0,P2)                SET OUTPUT PC(PC2)
A21 07F66 42190032 (00260) TOPSP1   SUBL(BR1,2)                   SIZE-1-2
A22 07F68 44BA0002 (00261) #1       ADD(BR0,WS,TF)                IQ=DCTM2(I) OR TMP2(I)
A23 07F6A 461922B1 (00262)          SUBL(BR1,1),JUMPP(#1)         FOR I=2,3,...LTH-2
A24 07F6C 48300037 (00263)          SET(WI)                       STALL BEFORE JUMP! CRITI
                   (00264) ;                                      CAL!!!
A25 07F6E 4A2F0000 (00265)          ADD(BR2,MS$,NA,C)             PC->PC0
A26 07F70 4C002160 (00266)          JUMP(TOPSP1)                  LET "CHANGE" SETTLE
                   (00267) *
A27 07F72 4E303940 (00268) G205$0   JSN(G205$3,P3)                SET OUTPUT PC(PC3)
A28 07F74 50C60A00 (00269)          LOAD(BW0,TMP2S(3),TF)         OQ=TMP2(0)
A29 07F76 525000FD (00270)          LOAD(BW1,SIZES-2)             TMP2(.) SIZE-3
A2A 07F78 54BE0002 (00271)          ADD(BW0,WS,TF,C)              OQ=TMP2(1),CHANGE PC
A2B 07F7A 56F20426 (00272)          LOAD(BW2,SASB2(1),TF)         OQ=U(7)+CTEMP
A2C 07F7C 58F20428 (00273)          LOAD(BW2,SASB3(1),TF)         OQ=ITOT
                   (00274) *
A2D 07F7E 5AF20422 (00275) OSUMS    LOAD(BW2,SASB0(1),TF)         OQ=CTEMP
                   (00276) *
A2E 07F80 5CC60A00 (00277) OADDS    LOAD(BW0,TMP2S(3),TF)         OQ=TMP2(0)
A2F 07F82 5E5000FD (00278)          LOAD(BW1,SIZES-2)             TMP2(.) SIZE-3
A30 07F84 60BE0002 (00279)          ADD(BW0,WS,TF,C)              OQ=TMP2(1),CHANGE PC
                   (00280) *
A31 07F86 62700003 (00281) DINPTS   LOAD(BW3,3)                   3+1=4 DUMMIES
A32 07F88 64F20794 (00282) #2       LOAD(BW2,DMYS(1),TF)          OQ=?
A33 07F8A 663132B1 (00283)          SUBL(BW3,1),JUMPP(#2)         FOR I=0,1,..3
A34 07F8C 68C60B00 (00284)          LOAD(BW0,TMP1S(3),TF)         OQ=TMP1(0)
A35 07F8E 6A5000FD (00285)          LOAD(BW1,SIZES-2)             TMP1(.) SIZE-3
A36 07F90 6CBE0002 (00286)          ADD(BW0,WS,TF,C)              OQ=TMP1(1),CHANGE PC
                   (00287) *
A37 07F92 6E200030 (00288) DNES0    CLEAR(R0)                     OUTPUT DONE!
A38 07F94 70000020 (00289)          NOP
A39 07F96 72300032 (00290) G205$3   SET(PA)                       ENABLE APU
A3A 07F98 74110031 (00291) TOPSP3   SUBL(BW1,1)                   SIZE-1-1
A3B 07F9A 76BA0002 (00292) #1       ADD(BW0,WS,TF)                OQ=TMP2(I) OR TMP1(I)
A3C 07F9C 781138B1 (00293)          SUBL(BW1,1),JUMPP(#1)         FOR I=2,3,..LTH-2
A3D 07F9E 7ABE0002 (00294)          ADD(BW0,WS,TF,C)              OQ=...(LTH-1),CHANGE PC
A3E 07FA0 7C003A60 (00295)          JUMP(TOPSP3)                  PC->PC2
                   (00296) *
          00007F2A (00297)          G205SA= #C                    ASSIGN VALUE TO CHAIN AN
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                 (00298) ;                                              CHOR
07FA2            (00299)            END #A-1
                 (00300) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
07FA2 00000000   (00301) G205$1  DATA 1F'0,0'
      00000080   (00302)         G205$Z=#L-G205$
07FA4            (00303)         END
```

```
AFDTSORG:   008FB (00007) (00032)
APSSMEM:    1FFC0 (00008)
CSPUSNDS:   021FC (00009) (00035)
DMYS:       00794 (00010) (00282)
DNFSA:      00083 (00205)
DNFS1:      0001F (00257)
DNFSO:      00037 (00288)
G205S:      07F24 (00034) (00216) (00222) (00302)
G205S1:     00020 (00223) (00259)
G205S3:     00039 (00268) (00290)
G205SA:     07F2A (00219) (00297)
G205SI:     07FA2 (00214) (00301)
G205SO:     00027 (00259) (00268)
G205SZ:     00080 (00218) (00302)
HS:         00001 (00012)
IADDS:      0000A (00235)
IINPTS:     0000F (00240)
INTPS1:     00017 (00249) (00251)
ISUMSS:     00006 (00230)
MSS:        00000 (00013) (00227) (00246) (00253) (00265)
NOK:        0006F (00164) (00180)
OADDS:      0002F (00277)
OINPTS:     00031 (00281)
OK:         00061 (00165)
OSUMS:      0002D (00275)
SS2:        00048 (00121) (00134)
SS3:        00049 (00124) (00135)
SS4:        0004A (00128) (00136)
SAS12:      0039A (00015) (00240)
SAS13:      0039C (00016) (00241)
SAS79:      00420 (00017) (00230)
SAS80:      00422 (00018) (00225) (00275)
SAS82:      00426 (00019) (00272)
SAS83:      00428 (00020) (00273)
SAS84:      0042A (00021) (00235)
SCAS:       07F12 (00033) (00049)
SCASSA:     00000 (00047) (00053) (00207)
SCASSZ:     00085 (00048) (00207) (00208)
SCLRS:      00002 (00216) (00225)
SINVS:      00026 (00095)
SIZFS:      000FF (00023) (00232) (00237) (00248) (00270) (00278) (00285)
SSUMS:      00038 (00115)
STAPT:      07F10 (00022) (00041)
SVTS:       003B2 (00014) (00015) (00016) (00017) (00018) (00019) (00020) (00021)
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TMP1S:     00R00 (00024) (00284)
TMP2S:     00A00 (00025) (00231) (00236) (00242) (00243) (00269) (00277)
TOPSP1:    00021 (00260) (00266)
TOPSP3:    0003A (00291) (00295)
VADDS:     00006 (00059) (00071)
VADDS2:    0005C (00160) (00172) (00181)
VADDS2E:   00070 (00173) (00182)
VADDSDN:   00021 (00076) (00079) (00083) (00088)
VDNS1:     0001C (00063) (00082) (00086)
VDNS2:     00014 (00066) (00073)
VINPTS:    00071 (00179) (00185)
WS:        00002 (00026) (00228) (00233) (00238) (00245) (00249) (00250) (00254) (00261) (00271)
                 (00279) (00286) (00292) (00294)
WWS:       00004 (00027)
ZS:        00003 (00028)
ZRO:       0006A (00169) (00175)
ZROLP:     00069 (00174) (00176)
ZZMS:      00007 (00029)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   F=    0
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```
                (00001) '  FCB 255... "MPCDBA(Y,U,V)"          COMPLETE DCT BIT ASSIGNMENT
                (00002) *                                  ORIGINATED:25-JUN-79
                (00003) *                                  UPDATED:22-MAY-80
                (00004) *  DEFINE GLOBAL SYMBOLS
                (00005)         OPADD EXP, (1 .LS. 14) + (12 .LS. 8) + $1E
                (00006)         OPADD UOF, (3 .LS. 10) + (12 .LS. 5) + $1B
       00000BE8 (00007)         AFDTSORG=$BE8
       0001FFC0 (00008)         APSSMEM=$1FFC0
       000021FC (00009)         CSPUSNOS=$21FC
       00000794 (00010)         DMYS=$794
       00000828 (00011)         IBITS=D'2088'
       00000003 (00012)         #M=3
       00000001 (00013)         HS=1
       00000000 (00014)         MSS=0
       00000382 (00015)         SVTS=$0382
       000003CE (00016)         SAS38=SVTS+2*D'38'
       00000420 (00017)         SAS79=SVTS+2*D'79'
       0000042A (00018)         SAS84=SVTS+2*D'84'
       000000FF (00019)         SIZES=D'256'-D'1'
       00008100 (00020)         START=$8100
       00000800 (00021)         TMP1S=D'2048'
       00000002 (00022)         WS=2
       00000004 (00023)         WWS=4
                (00024) *
                (00025) *  EXPAND ARRAY FUNCTION DISPATCH TABLE
       00000BE2 (00026)         #L=AFDTSORG+3*2*(255-128)                         FCB 255
00BE2 001E8102 (00027)         ADDR CDBA$(R7,1)
00BE4 001E816C (00028)         ADDR G102$(R7,1)
00BE6 001021FC (00029)         ADDR CSPUSNOS(,1,0)
                (00030)         EJECT
```

```
         (00031) *
         (00032) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
         (00033) *
00008100 (00034)          #L=START
         (00035)          EVEN
         (00036)          EJECT
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                          (00037) *
                          (00038) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                          (00039) *
                          (00040)          EVEN
    08100 0000            (00041)          DATA CDBASSA                      START ADDRESS
    08101 0031            (00042)          DATA CDBASSZ                      MODULE SIZE
                          (00043) CDBAS    BEGIN APU(CDBA)
          00000000        (00044)          #A=0
A00 08102 08F10000        (00045) CDBASSA  MOV(IOA,A1)\NOP                   IBITSL
A01 08104 08F008F7        (00046) TSTS     MOV(IOA,A0)\MOV(IOA,A7)           IBIT(I)
A02 08106 4820089C        (00047)          SUB(A1,A0)\MOV(R,00)              IBITSL-IBIT(I);00=IBIT(I
                          (00048) ;                                          -1)
A03 08108 089102F0        (00049)          MOV(R,A1)\R(A7)                   IBITSL=IBITSL-IBIT(I);R=
                          (00050) ;                                          IBIT(I)
A04 0810A 911F0009        (00051)          JUMPS(ADJS,T1)                    IF T1=1 NO BITS LEFT
A05 0810C 90160001        (00052)          JUMPC(TSTS,FWI)                   FOR ALL I,I=1,2...LTH
A06 0810E 0000089C        (00053)          NOP\MOV(R,00)                     IBIT(LTH)=IBIT(LTH)
A07 08110 901C0007        (00054) #1       JUMPC(#1,FO)                      WAIT FOR OUTPUT TO CLEAR
A08 08112 10370010        (00055)          JUMP(CLMPS,WI),CLEAR              BITS LEFT! RELEASE APS
                          (00056) *
A09 08114 40200000        (00057) ADJS     ADD(A1,A0)\NOP                    IBIT(I)-OV
A0A 08116 089C0000        (00058)          MOV(R,00)\NOP                     00=IBIT(I)=IBIT(I)-OV
A0B 08118 1049000D        (00059)          JUMP(FWISC,AF1),SET               ENTER 8 TEST,SET EOT
A0C 0811A 08F0081C        (00060) CLRS     MOV(IOA,NULL)\MOV(ZERO,00)        IBIT(I+1);IBIT(I+1)=0
A0D 0811C 9016000C        (00061) FWISC    JUMPC(CLRS,FWI)                   FOR ALL I,I=2,3...LTH
A0E 0811E 901C000E        (00062) #1       JUMPC(#1,FO)                      WAIT FOR OUTPUT TO CLEAR
A0F 08120 10370029        (00063)          JUMP(FIXS,WI),CLEAR               "IFIX" VALUES. RELEASE A
                          (00064) ;                                          PS
                          (00065) *
A10 08122 068008F0        (00066) CLMPS    K(-1,0)\MOV(IOA,A0)               R=-1;A0=5
A11 08124 08921680        (00067)          MOV(R,A2)\K(+1,0)                 A2=-1;R=1
A12 08126 00000892        (00068)          NOP\MOV(R,A2)                     A2=1
A13 08128 022002B0        (00069) LIMITS   R(A1)\R(A4)                       R=IBITSL;R=?,IBIT(I-1)
A14 0812A 089108D3        (00070) TSTS5    MOV(R,A1)\MOV(IO,A3)              A1=IBITSL;A3=IBIT(I)
A15 0812C 414048IC        (00071)          ADD(A2,A1)\MOV(00),SUB(A0,A3)     IBITSL-1;00=?,IBIT(I-1)
                          (00072) ;                                          THEN 5-IBIT(I)
A16 0812E 000008F4        (00073)          NOP\MOV(IOA,A4)                   A4=IBIT(I)
A17 08130 9116001C        (00074)          JUMPS(LSTISA,FWI)                 WI=1,RAF=0 SIGNALS END
A18 08132 911E0022        (00075)          JUMPS(MTSA,T1)                    IF T1=1 NO BITS LEFT
A19 08134 911F0013        (00076)          JUMPS(LIMITS,T2)                  IF T2=1 IBIT(I).GE.5
A1A 08136 00004280        (00077)          NOP\ADD(A4,A2)                    T1=T2=0 SO IBIT(I)+1
A1B 08138 10000014        (00078)          JUMP(TSTS5)                       FOR ALL I,I=1,2...LTH
A1C 0813A 911E0022        (00079) LSTISA   JUMPS(MTSA,T1)                    IF T1=1 NO BITS LEFT
A1D 0813C 901F001F        (00080)          JUMPC(LIMS1,T2)                   IF T2=1 IBIT(LTH).GE.5
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A1E 0813E 00000812 (00081)        NOP\MOV(ZERO,A2)          INCREMENT=0
A1F 08140 00004280 (00082) LIMS1  NOP\ADD(A4,A2)            IBIT(LTH)+2
A20 08142 0000089C (00083)        NOP\MOV(R,00)             IBIT(LTH)=IBIT(LTH)+2
A21 08144 10000027 (00084)        JUMP(MTSOUT)              INPUT CLEAR,CHECK OUTPUT
A22 08146 00000280 (00085) MTSA   NOP\R(A4)                 R=IBIT(2)
A23 08148 0000089C (00086)        NOP\MOV(R,00)             IBIT(2)=IBIT(2)
A24 0814A 10490026 (00087)        JUMP(MTSTST,AE1),SET      ENTER "MT QUEUE" & TEST
A25 0814C 08FC0000 (00088) MTSIN  MOV(IOA,00)\NOP           IBIT(I)=IBIT(I)
A26 0814E 90160025 (00089) MTSTST JUMPC(MTSIN,FW1)          WAIT FOR INPUT TO COMPLE
                   (00090) ;                                TE
A27 08150 90180027 (00091) MTSOUT JUMPC(MTSOUT,OOE)         WAIT FOR OUTPUT TO CLEAR
A28 08152 20372037 (00092)        CLEAR(W1)                 RELEASE APS INPUT
                   (00093) *
A29 08154 08FF08FF (00094) FIXS   MOV(IOA,M7)               M7=SA
A2A 08156 08F80000 (00095) #1     MOV(IOA,M0)\NOP           M0=UE
A2B 08158 000008F8 (00096)        NOP\MOV(IOA,M0)           M0=U0
A2C 0815A 84718471 (00097)        MOV(A1),MUL(M0,M7)        A0=P',P=SA*U
A2D 0815C 3A3C3A3C (00098)        MOV(00),ALIGN(A1)         00=R'',R''="IFIX"(P)
A2E 0815E 901D002A (00099)        JUMPC(#1,F1)              FOR ALL I=0,1,2...LTH-1
                   (00100) *
A2F 08160 20320000 (00101) DNESA  CLEAR(RA)\NOP             APU DONE
A30 08162 00000000 (00102)        NOP
                   (00103) *
          00000031 (00104)        CDBASSZ=#A-CDBASSA
    08164          (00105)        END CDBASSZ
                   (00106)        EJECT
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                        (00107) *
                        (00108) *>>>>>>>>>>>>>>>>>>>>>>>>>>>>> A P S <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        (00109) *
                        (00110)          EVEN
    0816A 000081F6      (00111)          ADDR G102SI                       POINTER TO CONSTRUCTED I
                        (00112) ;                                          NSTRUCTION BLOCK
    08166 00008170      (00113)          ADDR G102S+2*INSS                 POINTER TO SCALAR BLOCK
    08168 0000          (00114)          DATA 0                            NUMBER OF SCALARS
    08169 007C          (00115)          DATA G102SZ                       MODULE SIZE
    0816A 000081D6      (00116)          ADDR G102SA                       POINTER TO CHAIN ANCHOR
                        (00117)          EVEN                              END ON WORD BOUNDARY
                        (00118) *
                        (00119) G102S    BEGIN APS(G102)
A00 0816C 00201F40      (00120)          JSN(G102SO,P2)                    SET OUTPUT PC(P2)
A01 0816E 02300030      (00121)          SET(RO)                           ENABLE OUTPUT ADDRESSING
A02 08170 04F20420      (00122) INSS     LOAD(BR2,SAS79(1),TF)             IQ=BTLTH
A03 08172 064607FF      (00123)          LOAD(BR0,TMP1S-2(3))              TMP1(.) BA-2
A04 08174 085000FF      (00124)          LOAD(BR1,SIZES)                   TMP1(.) SIZE-1
A05 08176 0A8A0002      (00125) INST     ADD(BR0,WS,TF)                    IQ=TMP1(I)
A06 08178 0C8A0002      (00126)          ADD(BR0,WS,TF)                    IQ=TMP1(I+1)
A07 0817A 0E1905B2      (00127)          SUBL(BR1,2),JUMPP(INST)           FOR I=0,1,2...LTH-1
A08 0817C 10300037      (00128)          SET(WI)                           STALL APS INPUT
A09 0817E 12000020      (00129)          NOP                               RELEASED BY APU
A0A 08180 14300030      (00130)          SET(RO)                           RELEASE APS OUTPUT
A0B 08182 160017F9      (00131)          JUMPS(IFIXSS,AF1)                 AF1=1 THEN "IFIX" NOW
                        (00132) *
A0C 08184 18F2042A      (00133) CLMPSI   LOAD(BR2,SAS84(1),TF)             IQ=THRESHOLD=5.0
A0D 08186 1A7000FF      (00134)          LOAD(BR3,SIZES)                   TMP1(.) SIZE-1=# OF PASS
                        (00135) ;                                          ES
A0E 08188 1C4607FF      (00136) PASSSI   LOAD(BR0,TMP1S-2(3))              TMP1(.) BA-2
A0F 0818A 1E5000FF      (00137)          LOAD(BR1,SIZES)                   TMP1(.) SIZE-1
A10 0818C 200014F9      (00138)          JUMPS(FINSI,AF1)                  APU HAS FINISHED
A11 0818E 228A0002      (00139) INCSI    ADD(BR0,WS,TF)                    IQ=TMP1(I)
A12 08190 241911B1      (00140)          SUBL(BR1,1),JUMPP(INCSI)          FOR I=0,1,2...LTH-1
A13 08192 26390EB1      (00141)          SUBL(BR3,1),JUMPP(PASSSI)         PASS=1,2...LTH
A14 08194 28300037      (00142) FINSI    SET(WI)                           STALL APS INPUT
A15 08196 2A000020      (00143)          NOP                               RELEASED BY APU
A16 08198 2C300030      (00144)          SET(RO)                           RELEASE APS OUTPUT
                        (00145) *
A17 0819A 2EC203CE      (00146) IFIXSS   LOAD(BR0,SAS38(1),TF)             SCALAR SA=2**(-15)
A18 0819C 304607FF      (00147)          LOAD(BR0,TMP1S-2(3))              TMP1(.) BA-2
A19 0819E 32500103      (00148)          LOAD(BR1,SIZES+4)                 TMP1(.) SIZE-1+4
A1A 081A0 348A0002      (00149) IFIXSI   ADD(BR0,WS,TF)                    IQ=TMP1(I)
A1B 081A2 368A0002      (00150)          ADD(BR0,WS,TF)                    IQ=TMP1(I+1)
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A1C 081A4 38191AB2 (00151)          SUBL(BR1,2),JUMPP(IFIXSI)      FOR I=1,2...LTH+3
                   (00152) *
A1D 081A6 3A200031 (00153) DNFSI    CLEAR(RI)                      INPUT DONE!
A1E 081A8 3C000020 (00154)          NOP
                   (00155) *
A1F 081AA 3E300032 (00156) G102SO   SET(RA)                        ENABLE APU
A20 081AC 40F20794 (00157)          LOAD(BW2,DMYS(1),TF)           FOR OO=?
A21 081AE 424607FF (00158)          LOAD(BW0,TMP1S-2(3))           TMP1(.) BA-2
A22 081B0 445000FF (00159)          LOAD(BW1,SIZES)                TMP1(.) SIZE-1
A23 081B2 46BA0002 (00160) OUTST    ADD(BW0,WS,TF)                 OO=TMP1(J)
A24 081B4 48BA0002 (00161)          ADD(BW0,WS,TF)                 OO=TMP1(J+1)
A25 081B6 4A1123B2 (00162)          SUBL(BW1,2),JUMPP(OUTST)       FOR J=1,2...LTH-1
A26 081B8 4C200030 (00163)          CLEAR(RO)                      STALL APS OUTPUT
A27 081BA 4E000020 (00164)          NOP                            RELEASED BY APS INPUT
A28 081BC 500032F9 (00165)          JUMPS(OFIXS,AF1)               AF1=1 THEN "IFIX" NOW
                   (00166) *
A29 081BE 52F20794 (00167) CLMPSO   LOAD(BW2,DMYS(1),L,TF)         FOR OO=?
A2A 081C0 547000FF (00168)          LOAD(BW3,SIZES)                TMP1(.) SIZE-1=# OF PASS
                   (00169) ;                                       ES
A2B 081C2 564607FF (00170) PASSSO   LOAD(BW0,TMP1S-2(3))           TMP1(.) BA-2
A2C 081C4 585000FF (00171)          LOAD(BW1,SIZES)                TMP1(.) SIZE-1
A2D 081C6 5A0031F9 (0  72)          JUMPS(FINSO,AF1)               APU HAS FINISHED
A2E 081C8 5CBA0002 (0  73) INCSJ    ADD(BW0,WS,TF)                 OO=TMP1(J)
A2F 081CA 5E112FB1 (00174)          SUBL(BW1,1),JUMPP(INCSJ)       FOR J=1,2...LTH-1
A30 081CC 60312BB1 (00175)          SUBL(BW3,1),JUMPP(PASSSO)      PASS=1,2...LTH
A31 081CE 62200030 (00176) FINSO    CLEAR(RO)                      STALL APS OUTPUT
                   (00177) *
A32 081D0 64700003 (00178) OFIXS    LOAD(BW3,3)                    3+1=4 DUMMIES
A33 081D2 66F20794 (00179) #1       LOAD(BW2,DMYS(1),TF)           OO=?
A34 081D4 68313381 (00180)          SUBL(BW3,1),JUMPP(#1)          4 TIMES
A35 081D6 6A400000 (00181)          LOAD(BW0,[0])                  IBIT(.) BA
A36 081D8 6C500000 (00182)          LOAD(BW1,MSS)                  IBIT(.) SIZE-1
A37 081DA 6E020000 (00183)          SUB(BW0,MSS)                   IBIT(.) BA-1
A38 081DC 710A0001 (00184) OFIXSI   ADD(BW0,HS,TF)                 OO=IBIT(I)
A39 081DE 730A0001 (00185)          ADD(BW0,HS,TF)                 OO=IBIT(I+1)
A3A 081E0 74113BB2 (00186)          SUBL(BW1,2),JUMPP(OFIXSI)      FOR I=1,2...LTH-1
                   (00187) *
A3B 081E2 76200030 (00188) DNESO    CLEAR(RO)                      APU DONE
A3C 081E4 78000020 (00189)          NOP
                   (00190) *
          000081D6 (00191)          G102SA= #C                     FREEZE CHAIN ANCHOR
    081E6          (00192)          END #A-1
                   (00193) ;  STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
    081E6 00000000 (00194) G102SI   DATA 1F'0,0'
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        0000007C (00195)        G102$Z=#L-G102$
ORIEN            (00196)        END
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ADJS:       00009 (00051) (00057)
AFDTSORG:   008FB (00007) (00026)
APSSMEM:    1FFC0 (00008)
CDBAS:      08102 (00027) (00043)
CDBASSA:    00000 (00041) (00045) (00104)
CDBASSZ:    00031 (00042) (00104) (00105)
CLMPS:      00010 (00055) (00066)
CLMPSI:     0000C (00133)
CLMPSO:     00029 (00167)
CLRS:       0000C (00060) (00061)
CSPUSNOS:   021FC (00009) (00029)
DMYS:       00794 (00010) (00157) (00167) (00179)
DNFSA:      0002F (00101)
DNFSI:      0001D (00153)
DNFSO:      0003B (00188)
FINSI:      00014 (00138) (00142)
FINSO:      00031 (00172) (00176)
FIXS:       00029 (00063) (00094)
FWISC:      0000D (00059) (00061)
G102S:      0816C (00028) (00113) (00119) (00195)
G102SA:     081D6 (00116) (00191)
G102SI:     081F6 (00111) (00194)
G102SO:     0001F (00120) (00156)
G102SZ:     0007C (00115) (00195)
HS:         00001 (00013) (00184) (00185)
IBITS:      00828 (00011)
IFIXSI:     0001A (00149) (00151)
IFIXSS:     00017 (00131) (00146)
INSS:       00002 (00113) (00122)
INST:       00005 (00125) (00127)
INCSI:      00011 (00139) (00140)
INCSJ:      0002F (00173) (00174)
LIMSI:      0001F (00080) (00082)
LIMITS:     00013 (00069) (00076)
LSTISA:     0001C (00074) (00079)
MSS:        00000 (00014) (00182) (00183)
MTSA:       00022 (00075) (00079) (00085)
MTSIN:      00025 (00088) (00089)
MTSOUT:     00027 (00084) (00091) (00091)
MTSTST:     00026 (00087) (00089)
OFIXS:      00032 (00165) (00178)
OFIXSI:     00038 (00184) (00186)
OUTST:      00023 (00160) (00162)
PASSSI:     0000F (00136) (00141)
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PAGE     9:      FCB 255... "MPCDHA(Y,U,V)"            COMPLETE DCT BIT ASSIGNMENT

  PASS50:    0002B (00170) (00175)
  SAS38:     003CF (00016) (00146)
  SAS79:     00420 (00017) (00122)
  SAS84:     0042A (00018) (00133)
  SIZES:     000FF (00019) (00124) (00134) (00137) (00148) (00159) (00168) (00171)
  START:     08100 (00020) (00034)
  SVTS:      003B2 (00015) (00016) (00017) (00018)
  TMP1S:     00800 (00021) (00123) (00136) (00147) (00158) (00170)
  TSTS:      00001 (00046) (00052)
  TSTS5:     00014 (00070) (00078)
  WS:        00002 (00022) (00125) (00126) (00139) (00149) (00150) (00160) (00161) (00173)
  WWS:       00004 (00023)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E=    0
```

T A B L E   O F   C O N T E N T S

PAGE 1: LINE1.TXT ORIGINATED:18-APR-79

(00001) * LINE1.TXT ORIGINATED:18-APR-79

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                         *                 MODIFIED:04-JUN-80
                         ;  IOS2 PROGRAM TO TRANSMIT AND RECEIVE DATA
                         ;  & GENERATE INTERRUPTS AT BUFFER BOUNDARIES
                         ;  THE INTERRUPTS ARE TRAPPED AT THE CSPU WITH
                         ;  INTEGER SCALAR TABLE VALUES MODIFIED TO RE-
                         ;  FLECT THE STATUS OF THE I/O PORTS AS WELL
                         ;  AS THE BUFFER THEMSELVES. SEE "GTEIO.TXT"
                         ;  FOR A DEFINITION OF SCALAR VALUES.
                         ;
                         ;  REGISTER AND SYMBOL DEFINITIONS
          0000FCC4              CNTRL=$FCC4
          00000794              DMYS=$794
          00000793              DMYSM1=DMYS-1
          00000001              INCS=1
          00000000              ZROS=0
                         ;
                         ;  BUFFER DEFINITIONS
                         ;
          00000171              LSEN=D'369'
          000000F6              BLTH=D'246'
          00000170              LSENM1=LSEN-1
          000000B8              HB=LSENM1/2
          000011F8              RECV1=D'4600'
          00001369              RECV2=D'4969'
          000014DC              SEN1=D'5340'
          0000164E              SEN2=D'5710'
          000014DB              SEN1M1=SEN1-1
          0000164D              SEN2M1=SEN2-1
          0000164C              SEN1PBSM1=SEN1+LSENM1
          00001594              SEN1PHB=SEN1+HB
          000017BE              SEN2PBSM1=SEN2+LSENM1
          000011F7              RECV1M1=RECV1-1
          00001368              RECV2M1=RECV2-1
          00001368              RECV1PBSM1=RECV1+LSENM1
          000014D9              RECV2PBSM1=RECV2+LSENM1
                         ;
          00000000              R1=0
                                EVEN
                                BEGIN IOS2(OTEST+P)
A00 00000 01C0FCC4       TPS1   LOAD(R3,CNTRL)            R3=ICW CAN BE UPDATED BY
A01 00002 62300280              RR                        MAP READ(M -> I)
A02 00004 03E96400              ADDL(R3,ZROS,IP)          C(R3)+0 -> I(EMADD,15:0)
A03 00006 04300C00              JTEC(SETSE,P1)            P1=0 NO NEED FOR DUMMY
A05 0000A 06300200              RW                        MAP WRITE(I -> M)
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A06 0000C 07820794 (00046)          LOAD(R2,DPYS(1),L)          SET INPUT REG. @ DUMMY
A07 0000E 081A0000 (00047)          ADDL(R2,ZROS,TM)            GEN ADDR TO CLEAR P1
A08 00010 09820793 (00048) SETSF    LOAD(R2,DPYSM1(1),L)        SET R2 FOR FIRST INPUT
A09 00012 0A041594 (00049) SETS0    LOAD(R0,SEN1PBB(2),L)       SET OUTPUT REG. @ BASE-1
A0A 00014 0B3411F7 (00050) SETS1    LOAD(R1,RECV1M1(2),L)       SET INPUT REG. @ BASE-1
A0B 00016 0C300180 (00051)          CF1                         RESET "R0 BUMPED" FLAG
A0C 00018 0D300780 (00052)          CF2                         RESET "R1 BUMPED" FLAG
A0D 0001A 0E300600 (00053) CHKS0    JIFC(CHKS1,F1)              R0 BUMPED?
A0F 0001E 1028163C (00054)          JNE(CHKS01,R0,SEN1PBSM1)    YES,CHECK INDEX @ MIDDLE
A11 00022 12302009 (00055)          INT1                        MIDDLE! RELEASE BID0,ATT
                   (00056) ;                                    ACH BID2
A12 00024 1304164D (00057)          LOAD(R0,SEN2M1(2),L)        RESET BASE JUST BELOW 2
                   (00058) ;                                    ND BUFFER
A13 00026 1A300180 (00059)          JUMP(CHKS1),CF1             RESET "R0 BUMPED" FLAG
A14 00028 162817BE (00060) CHKS01   JNE(CHKS1,R0,SEN2PBSM1)     YES,CHECK INDEX @ END AD
A15 0002A 00000000
                   (00061) ;                                    DRESS
A17 0002E 18302000 (00062)          INT1                        END! RELEASE BID2,ATTACH
A18 00030 19300580 (00063)          CF1                         RESET "R0 BUMPED" FLAG
A19 00032 1A041308 (00064) RESETS0  LOAD(R0,SEN1M1(2),L)        RESET OUTPUT REG. @ BASE
                   (00065) ;                                    -1
A1A 00034 1C301800 (00066) CHKS1    JIFC(CHKSP,F2)              R1 BUMPED?
A1B 00036 00000000
A1D 0003A 1E681368 (00067)          JNE(CHKS11,P1,RECV1PBSM1)   YES,CHECK INDEX @ MIDDLE
A1F 0003E 20304000 (00068)          INT2                        MIDDLE! RELEASE BID1,ATT
                   (00069) ;                                    ACH BID3
A20 00040 21441368 (00070)          LOAD(R1,RECV2M1(2),L)       RESET BASE JUST BELOW 2
                   (00071) ;                                    ND BUFFER
A21 00042 28300380 (00072)          JUMP(CHKSP),CF2             RESET "R1 BUMPED" FLAG
A22 00044 24681109 (00073) CHKS11   JNE(CHKSP,R1,RECV2PBSM1)    YES,CHECK INDEX @ END AD
A23 00046 00000000
                   (00074) ;                                    DRESS
A25 0004A 26304000 (00075)          INT2                        END! RELEASE BID3,ATTACH
A26 0004C 274411F7 (00076) RESETS1  LOAD(R1,RECV1M1(2),L)       RESET INPUT REG. @ BASE-
                   (00077) ;                                    1
A27 0004E 28300380 (00078)          CF2                         RESET "R1 BUMPED" FLAG
A28 00050 2A301C00 (00079) CHKSP    JIFC(CHKSP1,P2)             CHECK P2 FOR DATA REQUES
A29 00052 00000000
                   (00080) ;                                    T.
A2B 00056 2C300280 (00081)          KR                          MAP READ(M -> I)
A2C 00058 2D3A0101 (00082)          ADDL(R0,INCS,IM)            GEN ADDRESS & RESET P2
A2D 0005A 2E300100 (00083)          SF1                         SET "R0 BUMPED" FLAG
A2E 0005C 30300C00 (00083) CHKSP1   JIFC(CHKS0,P1)              CHECK P1 FOR DATA REQUES
A2F 0005E 00000000
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                   (00085) ;                                  T.
A31 00062 32300200 (00086)         SV
A32 00064 33300700 (00087)         SE2                        SET "R1 BUMPED" FLAG
A33 00066 34AC0293 (00088)         JEQ(FIRSTS,R2,DMYSM1)      WASTE FIRST INPUT
A35 0006A 367A0001 (00089)         ADDL(R1,INCS,T9)           GEN ADDRESS & RESET P1
A36 0006C 0E300400 (00090)         JUMP(CHKS0)                TOP OF LOOP
A37 0006E 388A0001 (00091) FIRSTS  ADDL(R2,INCS,14)           GEN ADDRESS & RESET P1
A38 00070 0E300400 (00092)         JUMP(CHKS0)                TOP OF LOOP
A39 00072 35306000 (00093) DNES    STOP                       CSPU SHUTS IT OFF!
    00074          (00094)         END
```

```
PAGE    5:      LPFF1.TXT        ORIGINATED:18-APR-79
                                 MODIFIED:04-JUN-80

 BLTH:      000E6 (00021)
 CHKS0:     00001 (00053) (00084) (00090) (00092)
 CHKS01:    00014 (00054) (00060)
 CHKS1:     0001A (00053) (00059) (00060) (00066)
 CHKS11:    00022 (00067) (00073)
 CHKSP:     00028 (00066) (00072) (00073) (00079)
 CHKSP1:    0002E (00079) (00084)
 CNTRL:     00CC4 (00012) (00041)
 DLYS:      00794 (00013) (00014) (00046)
 DLYSM1:    00794 (00013) (00048) (00088)
 DNES:      00039 (00093)
 FIRSTS:    00037 (00088) (00091)
 HB:        00008 (00023) (00031)
 INCS:      00001 (00015) (00082) (00089) (00091)
 LSEN:      00171 (00020) (00022)
 LSENM1:    00170 (00022) (00023) (00030) (00032) (00035) (00036)
 RECV1:     011E8 (00024) (00033) (00035)
 RECV1M1:   011E7 (00033) (00050) (00076)
 RECV1PRS:  01368 (00035) (00067)
 RECV2:     01369 (00025) (00034) (00036)
 RECV2M1:   01368 (00034) (00070)
 RECV2PRS:  01409 (00036) (00073)
 RESETS0:   00019 (00064)
 RESETS1:   00026 (00076)
 SEN1:      0140C (00026) (00028) (00030) (00031)
 SEN1M1:    0140B (00028) (00064)
 SEN1PRSP:  0164C (00030) (00054)
 SEN1PHB:   01594 (00031) (00049)
 SEN2:      0164F (00027) (00029) (00032)
 SEN2M1:    0164D (00029) (00057)
 SEN2PRSP:  017EE (00032) (00060)
 SFTS0:     00009 (00049)
 SFTS1:     0000A (00050)
 SFTSF:     00008 (00044) (00048)
 TPS1:      00000 (00041)
 ZROS:      00000 (00016) (00043) (00047)

LINES WITH ERRORS:    0  (MAP VERSION R00101.10)   E=    0
```

3.6.2 Executive Programs

The modules contained in this section are:

GTE 300

IOS

FF2R

APDONE

CSPUIS

SKAP-II MAP-300 ARITH. MODULES - PROG. #830101.03 MAY 7, 1980

T A B L E   O F   C O N T E N T S

```
         * SNAP-II MAP-300 ARITH. MODULES - PROG. #830101.03 MAY 7, 1980
         *
         * MODIFIED FOR GTE SYLVANIA     BY S. TERRACE
         *
         *     MODULES INCLUDED:
         *
         *          NAME          FCR #
         *          ----          -----
         *
         *          VFLT           136
         *          VMOV           143
         *          VSMA1          144
         *          VCOS           186
         *
         *          FFTN           204
         *          FFTNB          205
         *          FFTIN          206
         *          FFTINB         207
         *
         *
         ! DEFINE SYMBOLS FOR ARRAY FUNCTION ASSEMBLIES
         *
         *
         * FROM THE SNAP-II EXECUTIVE  ---  REL. 3.05  --- 5/22/79
         *
         *
000008F8        AFDTSORG = $8F8
00000245        APSASSS = $245
00000EFA        APSHNDR = $EFA
00000F63        APSHNDR0 = $F63
00000F2D        APSHNDR1 = $F2D
0000024D        APSBSL = $24D
00000248        APSCSSC = $248
00000FB2        APSDONE = $FB2          MODIFIED FOR NEW START ADDRESS
0000000C        APSG0 = $C
0000000D        APSG1 = $D
00000010        APSPBFF = $10
0000000A        APSSAID = $A
0000000F        APSSSCLR = $F
00000009        APSSSS = $9
00000004        APSSHMO = $4
0001FFC0        APSR = $1FFC0
         *
00000604        HCTSAD = $604
```

```
00000686 (00045)        BCTSAT = $686
00000582 (00046)        BCTSHA = $582
00000000 (00047)        BITSG0 = $0
         (00048) *
00000792 (00049)        CLRSG0G1 = $792
000021FC (00050)        CSPUSNOS = $21FC
         (00051) *
00000794 (00052)        DMYS = $794
         (00053) *
00001AFA (00054)        ERRORS = $1AFA
         (00055) *
0000079A (00056)        FETSCHSZ = $79A
00000000 (00057)        FLGSCLR = $0
00000004 (00058)        FLGSG0 = $4
00000005 (00059)        FLGSG1 = $5
00000011 (00060)        FLGSRI = $11
00000020 (00061)        FLGSSET = $20
         (00062) *
00000001 (00063)        HS = 1
         (00064) *
00001B7E (00065)        LOADSAP = $1B7E
00001B8F (00066)        LOADSAP1 = $1B8F
         (00067) *
0000FF00 (00068)        MSKSLBYT = $FF00
000000FF (00069)        MSKSRBYT = $00FF
00000000 (00070)        MSS = 0
         (00071) *
000007AF (00072)        SHFTLSR5 = $7AF
000003B2 (00073)        SVTS = $3B2
000003CE (00074)        SVTSUN1 = $3CE
0001FFCE (00075)        SYSSFLGS = $1FFCE
         (00076) *
000007B4 (00077)        TEMS0 = $7B4
000021FE (00078)        TOFS = $21FE
000002B8 (00079)        TOFSPTR = $2B8
         (00080) *
00000002 (00081)        WS = $2
         (00082) *
000007BA (00083)        ZERO = $7BA
         (00084) *
         (00085) *
         (00086)        EJECT
```

```
                (00087) *
      00000288  (00088) *L = TOESPTR
                (00089) *
00288 00104678  (00090)        ADDR    TOESCUR(,1)             UPDATE TOP OF EXEC POINTER
                (00091) *
                (00092) *
                (00093) *  DEFINE SYMBOLS FOR THIS MODULE
                (00094) *
      00000003  (00095)        #M = 3
      00004000  (00096)        START = $4000                   DEFINE START LOCATION FOR MODULE
                (00097) *
                (00098) *
                (00099)        EJECT
```

```
* SPECIAL NOTE: THESE MODULES ARE THE SAME AS RELEASE 2.1 EXCEPT
* THE SPECIAL BINDING IN THE FFT'S AND SPECIAL FUNCTIONS HAVE BEEN
* MODIFIED FOR RELEASE 3.0
*
*
!  ARITHMETIC FUNCTIONS DISPATCH TABLE
*
*
* EVERY ARRAY FUNCTION OCCUPIES ONE NODE IN THE TABLE.
* THE NODE FOR ARRAY FCB #N WILL BE FOUND AT LOCATION
*        AFDTS - 3 * WS * (#N-128)
*
* EACH NODE CONSISTS OF 3 POINTERS AS FOLLOWS:
*        WORD 1 = ADDR  APU$MODULE(R7,1)
*        WORD 2 = ADDR  APS$MODULE(R7,1)
*        WORD 3 = ADDR CSPU$MODULE(,1,SSSV)
*            IF BIT 0 OF THE FCB CONTROL BITS = 0
*              NORMAL BINDING OCCURS AND CSPU$MODULE
*              IS EXECUTED FOR SPECIAL AP-DONE SUPPORT
*            ELSE CSPU$MODULE IS FOR SPECIAL BINDING
*            SSSV = SPECIAL SUPPORT SEMAPHORE VALUE
*
*
*
          EJECT
```

```
*  STANDARD FORMAT FOR ALL ARRAY FCB'S
*
*
*
*  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
*
*
*        !                         !                         !
*   WORD !        LEFT BYTE        !       RIGHT BYTE        !
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*        !                         !                         !
*    0   !    POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)!
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*        !                         !                         !
*    1   !  FCB NUMBER             !  CONTROL BITS           !
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*        !                         !                         !
*    2   !    Y [0] AND [8]        !           SA            !
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*        !                         !                         !
*    3   !    U [1] AND [9]        !           SB            !
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*        !                         !                         !
*    4   !    V [2] AND [10]       !           SC            !
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*        !                         !                         !
*    5   !    W [3] AND [11]       !           SD            !
*        !                         !                         !
*   -----!-------------------------!-------------------------!
*
*
*
*
         EJECT
```

```
           00000RFR (00165)          *L = AFDTSORG               SET PC TO DISPATCH TABLE
                    (00166) *
                    (00167) *
           00000000 (00168)          APUSNULL = 0                NULL VALUES FOR UNIMPLEMENTED FCB
           00000000 (00169)          APSSNULL = 0
                    (00170) *
                    (00171) *
U     008E8 001F0000 F-00000         ADDR     SADDS(R7,1)        128 = SCALAR ADD
U     008EA 001F0000 F-00172         ADDR     S0021S(R7,1)
      008EC 001021FC (00174)         ADDR     CSPUSNOS(,1,0)
                    (00175) *
U     008EE 001F0000 F-00173         ADDR     SSUBS(R7,1)        129 = SCALAR SUBTRACT
U     008F0 001F0000 F-00176         ADDR     S0021S(R7,1)
      008F2 001021FC (00178)         ADDR     CSPUSNOS(,1,0)
                    (00179) *
U     008F4 001F0000 F-00177         ADDR     SMULS(R7,1)        130 = SCALAR MULTIPLY
U     008F6 001F0000 E-00180         ADDR     S0021S(R7,1)
      008F8 001021FC (00182)         ADDR     CSPUSNOS(,1,0)
                    (00183) *
U     008FA 001F0000 F-00181         ADDR     SDIVS(R7,1)        131 = SCALAR DIVIDE
U     008FC 001E0000 E-00184         ADDR     S0021S(R7,1)
      008FE 001021FC (00186)         ADDR     CSPUSNOS(,1,0)
                    (00187) *
      00900 001E0000 (00188)         ADDR     APUSNULL(R7,1)     132 = UNASSIGNED
      00902 001F0000 (00189)         ADDR     APSSNULL(R7,1)
      00904 001021FC (00190)         ADDR     CSPUSNOS(,1,0)
                    (00191) *
      00906 001F0060 (00192)         ADDR     APUSNULL(R7,1)     133 = UNASSIGNED
      00908 001E0000 (00193)         ADDR     APSSNULL(R7,1)
      0090A 001021FC (00194)         ADDR     CSPUSNOS(,1,0)
                    (00195) *
      0090C 001F0000 (00196)         ADDR     APUSNULL(R7,1)     134 = UNASSIGNED
      0090E 001F0000 (00197)         ADDR     APSSNULL(R7,1)
      00910 001021FC (00198)         ADDR     CSPUSNOS(,1,0)
                    (00199) *
      00912 001E0000 (00200)         ADDR     APUSNULL(R7,1)     135 = UNASSIGNED
      00914 001F0000 (00201)         ADDR     APSSNULL(R7,1)
      00916 001021FC (00202)         ADDR     CSPUSNOS(,1,0)
                    (00203) *
      00918 001F40F6 (00204)         ADDR     VFLTS(R7,1)        136 = VECTOR FLOAT
      0091A 001F41BC (00205)         ADDR     V1124AS(R7,1)
      0091C 001021FC (00206)         ADDR     CSPUSNOS(,1,0)
                    (00207) *
U     0091E 001F0000 F-00185         ADDR     VFIXS(R7,1)        137 = VECTOR FIX
```

```
U     00920 001F0000 F-00208        ADDR    V1124BS(R7,1)
      00922 001021FC (00210)        ADDR    CSPUSNOS(,1,0)
                     (00211) *
      00924 001F0000 (00212)        ADDR    APUSNULL(R7,1)       138 = VECTOR FLOAT (8-BIT)
U     00926 001F0000 F-00209        ADDR    V1124CS(R7,1)
      00928 001021FC (00214)        ADDR    CSPUSNOS(,1,0)
                     (00215) *
U     0092A 001F0000 F-00213        ADDR    VFIXS(R7,1)          139 = VECTOR FIX (8-BIT)
U     0092C 001F0000 F-00216        ADDR    V1124DS(R7,1)
      0092E 001021FC (00218)        ADDR    CSPUSNOS(,1,0)
                     (00219) *
      00930 001F0000 (00220)        ADDR    APUSNULL(R7,1)       140 = UNASSIGNED
      00932 001F0000 (00221)        ADDR    APSSNULL(R7,1)
      00934 001021FC (00222)        ADDR    CSPUSNOS(,1,0)
                     (00223) *
      00936 001F0000 (00224)        ADDR    APUSNULL(R7,1)       141 = UNASSIGNED
      00938 001F0000 (00225)        ADDR    APSSNULL(R7,1)
      0093A 001021FC (00226)        ADDR    CSPUSNOS(,1,0)
                     (00227) *
      0093C 001F0000 (00228)        ADDR    APUSNULL(R7,1)       142 = UNASSIGNED
      0093E 001F0000 (00229)        ADDR    APSSNULL(R7,1)
      00940 001021FC (00230)        ADDR    CSPUSNOS(,1,0)
                     (00231) *
      00942 001F0000 (00232)        ADDR    APUSNULL(R7,1)       143 = UNASSIGNED
      00944 001F0000 (00233)        ADDR    APSSNULL(R7,1)
      00946 001021FC (00234)        ADDR    CSPUSNOS(,1,0)
                     (00235) *
      00948 001F4002 (00236)        ADDR    VSMA1S(R7,1)         144 = VECTOR SCALAR MULT-ADD(1 VECTOR)
      0094A 001F4122 (00237)        ADDR    V1124S(R7,1)
      0094C 001021FC (00238)        ADDR    CSPUSNOS(,1,0)
                     (00239) *
U     0094E 001F0000 F-00217        ADDR    VSMA2S(R7,1)         145 = VECTOR SCALAR MULT-ADD(2 VECTOR)
U     00950 001F0000 F-00240        ADDR    V2134AS(R7,1)
      00952 001021FC (00242)        ADDR    CSPUSNOS(,1,0)
                     (00243) *
U     00954 001F0000 F-00241        ADDR    VMULS(R7,1)          146 = VECTOR MULTIPL
U     00956 001F0000 F-00244        ADDR    V2134AS(R7,1)
      00958 001021FC (00246)        ADDR    CSPUSNOS(,1,0)
                     (00247) *
U     0095A 001F0000 F-00245        ADDR    VRCPS(R7,1)          147 = VECTOR RECPROCAL
      0095C 001F4122 (00249)        ADDR    V1124S(R7,1)
      0095E 001021FC (00250)        ADDR    CSPUSNOS(,1,0)
                     (00251) *
      00960 001F0000 (00252)        ADDR    APUSNULL(R7,1)       148 = VECTOR DIVIDE
```

```
      00962 001F0000 (00253)         ADDR     APS$NULL(R7,1)        CURRENTLY NOT IMPLEMENTED
      00964 001021FC (00254)         ADDR     CSPU$NOS(,1,0)
                     (00255) *
      00966 001F0000 (00256)         ADDR     APU$NULL(R7,1)        149 = UNASSIGNED
      00968 001E0000 (00257)         ADDR     APS$NULL(R7,1)
      0096A 001021FC (00258)         ADDR     CSPU$NOS(,1,0)
                     (00259) *
      0096C 001F0000 (00260)         ADDR     APU$NULL(R7,1)        150 = UNASSIGNED
      0096E 001F0000 (00261)         ADDR     APS$NULL(R7,1)
      00970 001021FC (00262)         ADDR     CSPU$NOS(,1,0)
                     (00263) *
      00972 001E0000 (00264)         ADDR     APU$NULL(R7,1)        151 = UNASSIGNED
      00974 001F0000 (00265)         ADDR     APS$NULL(R7,1)
      00976 001021FC (00266)         ADDR     CSPU$NOS(,1,0)
                     (00267) *
U     00978 001E0000 E-00248         ADDR     VSABS(R7,1)           152 = VECTOR ABSOLUTE
      0097A 001F4122 (00269)         ADDR     V1124$(R7,1)
      0097C 001021FC (00270)         ADDR     CSPU$NOS(,1,0)
                     (00271) *
U     0097E 001F0000 E-00268         ADDR     VSABSQ$(R7,1)         153 = VECTOR ABSOLUTE SQUARED
      00980 001E4122 (00273)         ADDR     V1124$(R7,1)
      00982 001021FC (00274)         ADDR     CSPU$NOS(,1,0)
                     (00275) *
U     00984 001E0000 E-00272         ADDR     VSQ$(R7,1)            154 = VECTOR SQUARE
      00986 001F4122 (00277)         ADDR     V1124$(R7,1)
      00988 001021FC (00278)         ADDR     CSPU$NOS(,1,0)
                     (00279) *
U     0098A 001F0000 E-00276         ADDR     VMAGSQ$(R7,1)         155 = VECTOR MAGNITUDE SQUARED
U     0098C 001E0000 E-00280         ADDR     V2134A$(R7,1)
      0098E 001021FC (00282)         ADDR     CSPU$NOS(,1,0)
                     (00283) *
U     00990 001E0000 E-00281         ADDR     VMAG$(R7,1)           156 = VECTOR MAGNITUDE
U     00992 001E0000 E-00284         ADDR     V2134A$(R7,1)
      00994 001021FC (00286)         ADDR     CSPU$NOS(,1,0)
                     (00287) *
U     00996 001F0000 E-00285         ADDR     VLOG16$(R7,1)         157 = VECTOR LOG
U     00998 001E0000 E-00288         ADDR     V2124A$(R7,1)
      0099A 001021FC (00290)         ADDR     CSPU$NOS(,1,0)
                     (00291) *
      0099C 001F0000 (00292)         ADDR     APU$NULL(R7,1)        158 = UNASSIGNED
      0099E 001E0000 (00293)         ADDR     APS$NULL(R7,1)
      009A0 001021FC (00294)         ADDR     CSPU$NOS(,1,0)
                     (00295) *
      009A2 001F0000 (00296)         ADDR     APU$NULL(R7,1)        159 = UNASSIGNED
```

```
      009A4 001F0000 (00297)          ADDR     APSSNULL(R7,1)
      009A6 001021FC (00298)          ADDR     CSPUSNOS(,1,0)
                     (00299) *
U     009A8 001F0000 F-00289          ADDR     VCLIPS(R7,1)        160 = VECTOR CLIP
      009AA 001F4122 (00301)          ADDR     V1124S(R7,1)
      009AC 001021FC (00302)          ADDR     CSPUSNOS(,1,0)
                     (00303) *
U     009AE 001F0000 F-00300          ADDR     VTHRSHS(R7,1)       161 = VECTOR THRESHOLD
      009B0 001F4122 (00305)          ADDR     V1124S(R7,1)
      009B2 001021FC (00306)          ADDR     CSPUSNOS(,1,0)
                     (00307) *
U     009B4 001F0000 F-00304          ADDR     VLIMITS(R7,1)       162 = VECTOR LIMIT
      009B6 001F4122 (00309)          ADDR     V1124S(R7,1)
      009B8 001021FC (00310)          ADDR     CSPUSNOS(,1,0)
                     (00311) *
U     009BA 001F0000 F-00308          ADDR     VCOMPS(R7,1)        163 = VECTOR COMPARE
U     009BC 001F0000 F-00312          ADDR     V2134AS(R7,1)
      009BE 001021FC (00314)          ADDR     CSPUSNOS(,1,0)
                     (00315) *
U     009C0 001F0000 F-00313          ADDR     VTAGS(R7,1)         164 = VECTOR TAG
      009C2 001F4122 (00317)          ADDR     V1124S(R7,1)
      009C4 001021FC (00318)          ADDR     CSPUSNOS(,1,0)
                     (00319) *
      009C6 001F0000 (00320)          ADDR     APUSNULL(R7,1)      165 = UNASSIGNED
      009C8 001F0000 (00321)          ADDR     APSSNULL(R7,1)
      009CA 001021FC (00322)          ADDR     CSPUSNOS(,1,0)
                     (00323) *
      009CC 001F0000 (00324)          ADDR     APUSNULL(R7,1)      166 = UNASSIGNED
      009CE 001F0000 (00325)          ADDR     APSSNULL(R7,1)
      009D0 001021FC (00326)          ADDR     CSPUSNOS(,1,0)
                     (00327) *
      009D2 001F0000 (00328)          ADDR     APUSNULL(R7,1)      167 = UNASSIGNED
      009D4 001F0000 (00329)          ADDR     APSSNULL(R7,1)
      009D6 001021FC (00330)          ADDR     CSPUSNOS(,1,0)
                     (00331) *
U     009D8 001F0000 F-00316          ADDR     SSUMS(R7,1)         168 = SCALAR SUM
U     009DA 001F0000 F-00332          ADDR     S1011S(R7,1)
      009DC 001021FC (00334)          ADDR     CSPUSNOS(,1,0)
                     (00335) *
U     009DE 001F0000 F-00333          ADDR     SSUMABS(R7,1)       169 = SCALAR SUM OF ABSOLUTES
U     009E0 001F0000 F-00336          ADDR     S1011S(R7,1)
      009E2 001021FC (00338)          ADDR     CSPUSNOS(,1,0)
                     (00339) *
U     009E4 001F0000 F-00337          ADDR     SSUMSQS(R7,1)       170 = SCALAR SUM OF SQUARES
```

```
U    009F6 001E0000 E-00340         ADDR    S1011$(R7,1)
     009F8 001021FC (00342)         ADDR    CSPU$NOS(,1,0)
                    (00343) *
U    009FA 001E0000 E-00341         ADDR    SMAX$(R7,1)         171 = SCALAR MAXIMUM
U    009FC 001E0000 E-00344         ADDR    S1002$(R7,1)
     009FE 001021FC (00346)         ADDR    CSPU$NOS(,1,0)
                    (00347) *
U    009F0 001E0000 E-00345         ADDR    SMAXAB$(R7,1)       172 = SCALAR MAXIMUM ABSOLUTE
U    009F2 001E0000 E-00348         ADDR    S1002$(R7,1)
     009F4 001021FC (00350)         ADDR    CSPU$NOS(,1,0)
                    (00351) *
U    009F6 001E0000 E-00349         ADDR    SDOT$(R7,1)         173 = SCALAR DOT PRODUCT
U    009F8 001E0000 E-00352         ADDR    S2011$(R7,1)
     009FA 001021FC (00354)         ADDR    CSPU$NOS(,1,0)
                    (00355) *
     009FC 001E0000 (00356)         ADDR    APU$NULL(R7,1)      174 = UNASSIGNED
     009FE 001E0000 (00357)         ADDR    APS$NULL(R7,1)
     00A00 001021FC (00358)         ADDR    CSPU$NOS(,1,0)
                    (00359) *
     00A02 001E0000 (00360)         ADDR    APU$NULL(R7,1)      175 = UNASSIGNED
     00A04 001E0000 (00361)         ADDR    APS$NULL(R7,1)
     00A06 001021FC (00362)         ADDR    CSPU$NOS(,1,0)
                    (00363) *
U    00A08 001E0000 E-00353         ADDR    CVMUL$(R7,1)        176 = COMPLEX VECTOR MULTIPLY
U    00A0A 001E0000 E-00364         ADDR    C2124A$(R7,1)
     00A0C 001021FC (00366)         ADDR    CSPU$NOS(,1,0)
                    (00367) *
U    00A0E 001E0000 E-00365         ADDR    CCVMUL$(R7,1)       177 = COMPLEX CONJ. VECTOR MULTIPLY
U    00A10 001E0000 E-00368         ADDR    C2124A$(R7,1)
     00A12 001021FC (00370)         ADDR    CSPU$NOS(,1,0)
                    (00371) *
U    00A14 001E0000 E-00369         ADDR    CVRCP$(R7,1)        178 = COMPLEX VECTOR RECIPRICAL
U    00A16 001E0000 E-00372         ADDR    C1124A$(R7,1)
     00A18 001021FC (00374)         ADDR    CSPU$NOS(,1,0)
                    (00375) *
U    00A1A 001E0000 E-00373         ADDR    CPOLAR$(R7,1)       179 = COMPLEX POLAR CONVERSION
U    00A1C 001E0000 E-00376         ADDR    C1124B$(R7,1)
     00A1E 001021FC (00378)         ADDR    CSPU$NOS(,1,0)
                    (00379) *
     00A20 001E0000 (00380)         ADDR    APU$NULL(R7,1)      180 = COMPLEX RECTANGULAR CONVERSION
     00A22 001E0000 (00381)         ADDR    APS$NULL(R7,1)        CURRENTLY NOT IMPLEMENTED
     00A24 001021FC (00382)         ADDR    CSPU$NOS(,1,0)
                    (00383) *
     00A26 001E0000 (00384)         ADDR    APU$NULL(R7,1)      181 = UNASSIGNED
```

```
      00A28 001F0000 (00385)          ADDR     APSSNULL(R7,1)
      00A2A 001021FC (00386)          ADDR     CSPUSNOS(,1,0)
                     (00387) *
U     00A2C 001F0000 F-00377          ADDR     CXMULS(R7,1)        182 = COMPLEX EXPONENTIAL MULTIPLY
U     00A2E 001F0000 F-00388          ADDR     C2120S(R7,1)
      00A30 001021FC (00390)          ADDR     CSPUSNOS(,1,0)
                     (00391) *
U     00A32 001F0000 F-00389          ADDR     CXMULRS(R7,1)       183 = COMPLEX EXPON. MULTIPLY BY REAL
U     00A34 001E0000 F-00392          ADDR     C1120S(R7,1)
      00A36 001021FC (00394)          ADDR     CSPUSNOS(,1,0)
                     (00395) *
U     00A38 001F0000 F-00393          ADDR     VPOLYS(R7,1)        184 = VECTOR POLYNOMIAL
U     00A3A 001F0000 F-00396          ADDR     V2116AS(R7,1)
U     00A3C 00100000 F-00397          ADDR     SHMSVPLY(,1,0)
                     (00399) *
U     00A3E 001E0000 F-00398          ADDR     VRAMPS(R7,1)        185 = VECTOR RAMP
      00A40 001F4122 (00401)          ADDR     V1124S(R7,1)
      00A42 001021FC (00402)          ADDR     CSPUSNOS(,1,0)
                     (00403) *
      00A44 001F4020 (00404)          ADDR     VCOSS(R7,1)         186 = VECTOR COSINE
      00A46 001E41F6 (00405)          ADDR     V2134BS(R7,1)
      00A48 001021FC (00406)          ADDR     CSPUSNOS(,1,0)
                     (00407) *
U     00A4A 001F0000 F-00400          ADDR     VPOWS(R7,1)         187 = VECTOR POWER
U     00A4C 001F0000 F-00408          ADDR     V3112AS(R7,1)
      00A4E 001021FC (00410)          ADDR     CSPUSNOS(,1,0)
                     (00411) *
      00A50 001E0000 (00412)          ADDR     APUSNULL(R7,1)      188 = UNASSIGNED
      00A52 001E0000 (00413)          ADDR     APSSNULL(R7,1)
      00A54 001021FC (00414)          ADDR     CSPUSNOS(,1,0)
                     (00415) *
      00A56 001E0000 (00416)          ADDR     APUSNULL(R7,1)      189 = UNASSIGNED
      00A58 001E0000 (00417)          ADDR     APSSNULL(R7,1)
      00A5A 001021FC (00418)          ADDR     CSPUSNOS(,1,0)
                     (00419) *
      00A5C 001E0000 (00420)          ADDR     APUSNULL(R7,1)      190 = UNASSIGNED
      00A5E 001E0000 (00421)          ADDR     APSSNULL(R7,1)
      00A60 001021FC (00422)          ADDR     CSPUSNOS(,1,0)
                     (00423) *
      00A62 001F0000 (00424)          ADDR     APUSNULL(R7,1)      191 = UNASSIGNED
      00A64 001F0000 (00425)          ADDR     APSSNULL(R7,1)
      00A66 001021FC (00426)          ADDR     CSPUSNOS(,1,0)
                     (00427) *
U     00A68 001E0000 F-00409          ADDR     DDIFFS(R7,1)        192 = DISCRETE DIFFERENTIATION
```

```
U     00A6A 001F0000 F-00428          ADDR     D1113$(R7,1)
      00A6C 001021FC (00430)          ADDR     CSPU$NOS(,1,0)
                     (00431) *
U     00A6E 001F0000 F-00429          ADDR     DINTG$(R7,1)        193 = DISCRETE INTEGRATION
U     00A70 001F0000 F-00432          ADDR     D1113$(R7,1)
      00A72 001021FC (00434)          ADDR     CSPU$NOS(,1,0)
                     (00435) *
U     00A74 001F0000 F-00433          ADDR     DFIL22$(R7,1)       194 = DISCRETE FILTER(2-POLES, 2-ZEROS)
U     00A76 001F0000 F-00436          ADDR     D1186$(R7,1)
      00A78 001021FC (00438)          ADDR     CSPU$NOS(,1,0)
                     (00439) *
U     00A7A 001F0000 F-00437          ADDR     DCVM$(R7,1)         195 = DISCRETE CONVOLUTION MULTIPLY
U     00A7C 001F0000 F-00440          ADDR     D2116$(R7,1)
U     00A7E 00100000 F-00441          ADDR     SHM$DCVM(,1,0)
                     (00443) *
      00A80 001F0000 (00444)          ADDR     APU$NULL(R7,1)      196 = UNASSIGNED
      00A82 001F0000 (00445)          ADDR     APS$NULL(R7,1)
      00A84 001021FC (00446)          ADDR     CSPU$NOS(,1,0)
                     (00447) *
      00A86 001F0000 (00448)          ADDR     APU$NULL(R7,1)      197 = UNASSIGNED
      00A88 001F0000 (00449)          ADDR     APS$NULL(R7,1)
      00A8A 001021FC (00450)          ADDR     CSPU$NOS(,1,0)
                     (00451) *
      00A8C 001F0000 (00452)          ADDR     APU$NULL(R7,1)      198 = UNASSIGNED
      00A8E 001F0000 (00453)          ADDR     APS$NULL(R7,1)
      00A90 001021FC (00454)          ADDR     CSPU$NOS(,1,0)
                     (00455) *
      00A92 001F0000 (00456)          ADDR     APU$NULL(R7,1)      199 = UNASSIGNED
      00A94 001F0000 (00457)          ADDR     APS$NULL(R7,1)
      00A96 001021FC (00458)          ADDR     CSPU$NOS(,1,0)
                     (00459) *
U     00A98 001F0000 F-00442 FSCR$DSP ADDR     FSCR$(R7,1)         200 = FOURIER SCRAMBLE
U     00A9A 001F0000 F-00460          ADDR     F11C$(R7,1)
      00A9C 001021FC (00462)          ADDR     CSPU$NOS(,1,0)
                     (00463) *
U     00A9E 001F0000 F-00461 FRX4$DSP ADDR     FRX4$(R7,1)         201 = FOURIER RADIX-4 TRANSFORM
U     00AA0 001F0000 F-00464          ADDR     F21B$(R7,1)
      00AA2 001021FC (00466)          ADDR     CSPU$NOS(,1,0)
                     (00467) *
U     00AA4 001F0000 F-00465 FEOS$DSP ADDR     FEOS$(R7,1)         202 = FOURIER EVEN-ODD SEPERATE
U     00AA6 001F0000 F-00468          ADDR     F11A$(R7,1)
      00AA8 001021FC (00470)          ADDR     CSPU$NOS(,1,0)
                     (00471) *
U     00AAA 001F0000 F-00469 FSC4$DSP ADDR     FSC4$(R7,1)         203 = FOURIER SCARAMBLE - EVEN PWRS OF 2
```

```
U     00AAC 001E0000 E-00472          ADDR    E11CS(R7,1)
      00AAE 001021FC (00474)          ADDR    CSPUSNOS(,1,0)
                     (00475) *
      00AB0 001E0000 (00476)          ADDR    APUSNULL(R7,1)      204 = UNASSIGNED
      00AB2 001E0000 (00477)          ADDR    APSSNULL(R7,1)
      00AB4 001021FC (00478)          ADDR    CSPUSNOS(,1,0)
                     (00479) *
      00AB6 001E0000 (00480)          ADDR    APUSNULL(R7,1)      205 = UNASSIGNED
      00AB8 001E0000 (00481)          ADDR    APSSNULL(R7,1)
      00ABA 001021FC (00482)          ADDR    CSPUSNOS(,1,0)
                     (00483) *
      00ABC 001E0000 (00484)          ADDR    APUSNULL(R7,1)      206 = UNASSIGNED
      00ABE 001E0000 (00485)          ADDR    APSSNULL(R7,1)
      00AC0 001021FC (00486)          ADDR    CSPUSNOS(,1,0)
                     (00487) *
      00AC2 001E0000 (00488)          ADDR    APUSNULL(R7,1)      207 = UNASSIGNED
      00AC4 001E0000 (00489)          ADDR    APSSNULL(R7,1)
      00AC6 001021FC (00490)          ADDR    CSPUSNOS(,1,0)
                     (00491) *
      00AC8 001E0000 (00492)          ADDR    APUSNULL(R7,1)      208 = FOWARD FFT(COMPLEX-COMPLEX)
      00ACA 001E0000 (00493)          ADDR    APSSNULL(R7,1)
U     00ACC 00100000 E-00473          ADDR    FF3SSSM(,1,0)
                     (00495) *
      00ACE 001E0000 (00496)          ADDR    APUSNULL(R7,1)      209 = INVERSE FFT(COMPLEX-COMPLEX)
      00AD0 001E0000 (00497)          ADDR    APSSNULL(R7,1)
U     00AD2 00100000 E-00494          ADDR    IFF3SSSM(,1,0)
                     (00499) *
      00AD4 001E0000 (00500)          ADDR    APUSNULL(R7,1)      210 = FOWARD FFT(REAL-COMPLEX)
      00AD6 001E0000 (00501)          ADDR    APSSNULL(R7,1)
U     00AD8 00100000 E-00498          ADDR    RF3SSSM(,1,0)
                     (00503) *
      00ADA 001E0000 (00504)          ADDR    APUSNULL(R7,1)      211 = INVERSE FFT(REAL-COMPLEX)
      00ADC 001E0000 (00505)          ADDR    APSSNULL(R7,1)
U     00ADE 00100000 E-00502          ADDR    IRF3SSSM(,1,0)
                     (00507) *
      00AE0 001E0000 (00508)          ADDR    APUSNULL(R7,1)      212 = UNASSIGNED
      00AE2 001E0000 (00509)          ADDR    APSSNULL(R7,1)
      00AE4 001021FC (00510)          ADDR    CSPUSNOS(,1,0)
                     (00511) *
      00AE6 001E0000 (00512)          ADDR    APUSNULL(R7,1)      213 = UNASSIGNED
      00AE8 001E0000 (00513)          ADDR    APSSNULL(R7,1)
      00AEA 001021FC (00514)          ADDR    CSPUSNOS(,1,0)
                     (00515) *
      00AEC 001E0000 (00516)          ADDR    APUSNULL(R7,1)      214 = UNASSIGNED
```

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00AEE 001E0000 (00517)          ADDR    APS$NULL(R7,1)
00AF0 001021FC (00518)          ADDR    CSPU$NOS(,1,0)
               (00519) *
00AF2 001E0000 (00520)          ADDR    APU$NULL(R7,1)      215 = UNASSIGNED
00AF4 001E0000 (00521)          ADDR    APS$NULL(R7,1)
00AF6 001021FC (00522)          ADDR    CSPU$NOS(,1,0)
               (00523) *
00AF8 001E0000 (00524)          ADDR    APU$NULL(R7,1)      216 = UNASSIGNED
00AFA 001E0000 (00525)          ADDR    APS$NULL(R7,1)
00AFC 001021FC (00526)          ADDR    CSPU$NOS(,1,0)
               (00527) *
00AFE 001E0000 (00528)          ADDR    APU$NULL(R7,1)      217 = UNASSIGNED
00B00 001E0000 (00529)          ADDR    APS$NULL(R7,1)
00B02 001021FC (00530)          ADDR    CSPU$NOS(,1,0)
               (00531) *
00B04 001E0000 (00532)          ADDR    APU$NULL(R7,1)      218 = UNASSIGNED
00B06 001E0000 (00533)          ADDR    APS$NULL(R7,1)
00B08 001021FC (00534)          ADDR    CSPU$NOS(,1,0)
               (00535) *
00B0A 001E0000 (00536)          ADDR    APU$NULL(R7,1)      219 = UNASSIGNED
00B0C 001E0000 (00537)          ADDR    APS$NULL(R7,1)
00B0E 001021FC (00538)          ADDR    CSPU$NOS(,1,0)
               (00539) *
00B10 001E0000 (00540)          ADDR    APU$NULL(R7,1)      220 = UNASSIGNED
00B12 001E0000 (00541)          ADDR    APS$NULL(R7,1)
00B14 001021FC (00542)          ADDR    CSPU$NOS(,1,0)
               (00543) *
00B16 001E0000 (00544)          ADDR    APU$NULL(R7,1)      221 = UNASSIGNED
00B18 001E0000 (00545)          ADDR    APS$NULL(R7,1)
00B1A 001021FC (00546)          ADDR    CSPU$NOS(,1,0)
               (00547) *
00B1C 001E0000 (00548)          ADDR    APU$NULL(R7,1)      222 = UNASSIGNED
00B1E 001E0000 (00549)          ADDR    APS$NULL(R7,1)
00B20 001021FC (00550)          ADDR    CSPU$NOS(,1,0)
               (00551) *
00B22 001E0000 (00552)          ADDR    APU$NULL(R7,1)      223 = UNASSIGNED
00B24 001E0000 (00553)          ADDR    APS$NULL(R7,1)
00B26 001021FC (00554)          ADDR    CSPU$NOS(,1,0)
               (00555) *
00B28 001E0000 (00556)          ADDR    APU$NULL(R7,1)      224 = UNASSIGNED
00B2A 001E0000 (00557)          ADDR    APS$NULL(R7,1)
00B2C 001021FC (00558)          ADDR    CSPU$NOS(,1,0)
               (00559) *
00B2E 001E0000 (00560)          ADDR    APU$NULL(R7,1)      225 = UNASSIGNED
```

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00B[illegible] 001F0000 (00561)       ADDR    APS$NULL(R7,1)
00B32 001021FC (00562)       ADDR    CSPU$NOS(,1,0)
               (00563) *
00B34 001F0000 (00564)       ADDR    APU$NULL(R7,1)      226 = UNASSIGNED
00B36 001F0000 (00565)       ADDR    APS$NULL(R7,1)
00B38 001021FC (00566)       ADDR    CSPU$NOS(,1,0)
               (00567) *
00B3A 001F0000 (00568)       ADDR    APU$NULL(R7,1)      227 = UNASSIGNED
00B3C 001F0000 (00569)       ADDR    APS$NULL(R7,1)
00B3E 001021FC (00570)       ADDR    CSPU$NOS(,1,0)
               (00571) *
00B40 001F0000 (00572)       ADDR    APU$NULL(R7,1)      228 = UNASSIGNED
00B42 001F0000 (00573)       ADDR    APS$NULL(R7,1)
00B44 001021FC (00574)       ADDR    CSPU$NOS(,1,0)
               (00575) *
00B46 001F0000 (00576)       ADDR    APU$NULL(R7,1)      229 = UNASSIGNED
00B48 001F0000 (00577)       ADDR    APS$NULL(R7,1)
00B4A 001021FC (00578)       ADDR    CSPU$NOS(,1,0)
               (00579) *
00B4C 001F0000 (00580)       ADDR    APU$NULL(R7,1)      230 = UNASSIGNED
00B4E 001F0000 (00581)       ADDR    APS$NULL(R7,1)
00B50 001021FC (00582)       ADDR    CSPU$NOS(,1,0)
               (00583) *
00B52 001F0000 (00584)       ADDR    APU$NULL(R7,1)      231 = UNASSIGNED
00B54 001F0000 (00585)       ADDR    APS$NULL(R7,1)
00B56 001021FC (00586)       ADDR    CSPU$NOS(,1,0)
               (00587) *
00B58 001F0000 (00588)       ADDR    APU$NULL(R7,1)      232 = UNASSIGNED
00B5A 001F0000 (00589)       ADDR    APS$NULL(R7,1)
00B5C 001021FC (00590)       ADDR    CSPU$NOS(,1,0)
               (00591) *
00B5E 001F0000 (00592)       ADDR    APU$NULL(R7,1)      233 = UNASSIGNED
00B60 001F0000 (00593)       ADDR    APS$NULL(R7,1)
00B62 001021FC (00594)       ADDR    CSPU$NOS(,1,0)
               (00595) *
00B64 001F0000 (00596)       ADDR    APU$NULL(R7,1)      234 = UNASSIGNED
00B66 001F0000 (00597)       ADDR    APS$NULL(R7,1)
00B68 001021FC (00598)       ADDR    CSPU$NOS(,1,0)
               (00599) *
00B6A 001F0000 (00600)       ADDR    APU$NULL(R7,1)      235 = UNASSIGNED
00B6C 001F0000 (00601)       ADDR    APS$NULL(R7,1)
00B6E 001021FC (00602)       ADDR    CSPU$NOS(,1,0)
               (00603) *
00B70 001F0000 (00604)       ADDR    APU$NULL(R7,1)      236 = UNASSIGNED
```

```
00B72 001F0000 (00605)          ADDR     APS$NULL(R7,1)
00B74 001021FC (00606)          ADDR     CSPU$NOS(,1,0)
               (00607) *
00B76 001F0000 (00608)          ADDR     APU$NULL(R7,1)       237 = UNASSIGNED
00B78 001F0000 (00609)          ADDR     APS$NULL(R7,1)
00B7A 001021FC (00610)          ADDR     CSPU$NOS(,1,0)
               (00611) *
00B7C 001F0000 (00612)          ADDR     APU$NULL(R7,1)       238 = UNASSIGNED
00B7E 001F0000 (00613)          ADDR     APS$NULL(R7,1)
00B80 001021FC (00614)          ADDR     CSPU$NOS(,1,0)
               (00615) *
00B82 001F0000 (00616)          ADDR     APU$NULL(R7,1)       239 = UNASSIGNED
00B84 001F0000 (00617)          ADDR     APS$NULL(R7,1)
00B86 001021FC (00618)          ADDR     CSPU$NOS(,1,0)
               (00619) *
00B88 001F0000 (00620)          ADDR     APU$NULL(R7,1)       240 = UNASSIGNED
00B8A 001F0000 (00621)          ADDR     APS$NULL(R7,1)
00B8C 001021FC (00622)          ADDR     CSPU$NOS(,1,0)
               (00623) *
00B8E 001F0000 (00624)          ADDR     APU$NULL(R7,1)       241 = UNASSIGNED
00B90 001F0000 (00625)          ADDR     APS$NULL(R7,1)
00B92 001021FC (00626)          ADDR     CSPU$NOS(,1,0)
               (00627) *
00B94 001F0000 (00628)          ADDR     APU$NULL(R7,1)       242 = UNASSIGNED
00B96 001F0000 (00629)          ADDR     APS$NULL(R7,1)
00B98 001021FC (00630)          ADDR     CSPU$NOS(,1,0)
               (00631) *
00B9A 001F0000 (00632)          ADDR     APU$NULL(R7,1)       243 = UNASSIGNED
00B9C 001F0000 (00633)          ADDR     APS$NULL(R7,1)
00B9E 001021FC (00634)          ADDR     CSPU$NOS(,1,0)
               (00635) *
00BA0 001F0000 (00636)          ADDR     APU$NULL(R7,1)       244 = UNASSIGNED
00BA2 001F0000 (00637)          ADDR     APS$NULL(R7,1)
00BA4 001021FC (00638)          ADDR     CSPU$NOS(,1,0)
               (00639) *
00BA6 001F0000 (00640)          ADDR     APU$NULL(R7,1)       245 = UNASSIGNED
00BA8 001F0000 (00641)          ADDR     APS$NULL(R7,1)
00BAA 001021FC (00642)          ADDR     CSPU$NOS(,1,0)
               (00643) *
00BAC 001F0000 (00644)          ADDR     APU$NULL(R7,1)       246 = UNASSIGNED
00BAE 001F0000 (00645)          ADDR     APS$NULL(R7,1)
00BB0 001021FC (00646)          ADDR     CSPU$NOS(,1,0)
               (00647) *
00BB2 001F0000 (00648)          ADDR     APU$NULL(R7,1)       247 = UNASSIGNED
```

```
00BB4 001F0000 (00649)          ADDR     APSSNULL(R7,1)
00BB6 001021FC (00650)          ADDR     CSPUSNOS(,1,0)
               (00651) *
00BB8 001F0000 (00652)          ADDR     APUSNULL(R7,1)        248 = UNASSIGNED
00BBA 001F0000 (00653)          ADDR     APSSNULL(R7,1)
00BBC 001021FC (00654)          ADDR     CSPUSNOS(,1,0)
               (00655) *
00BBE 001F0000 (00656)          ADDR     APUSNULL(R7,1)        249 = UNASSIGNED
00BC0 001F0000 (00657)          ADDR     APSSNULL(R7,1)
00BC2 001021FC (00658)          ADDR     CSPUSNOS(,1,0)
               (00659) *
00BC4 001F0000 (00660)          ADDR     APUSNULL(R7,1)        250 = UNASSIGNED
00BC6 001F0000 (00661)          ADDR     APSSNULL(R7,1)
00BC8 001021FC (00662)          ADDR     CSPUSNOS(,1,0)
               (00663) *
00BCA 001F0000 (00664)          ADDR     APUSNULL(R7,1)        251 = UNASSIGNED
00BCC 001F0000 (00665)          ADDR     APSSNULL(R7,1)
00BCE 001021FC (00666)          ADDR     CSPUSNOS(,1,0)
               (00667) *
00BD0 001F0000 (00668)          ADDR     APUSNULL(R7,1)        252 = UNASSIGNED
00BD2 001F0000 (00669)          ADDR     APSSNULL(R7,1)
00BD4 001021FC (00670)          ADDR     CSPUSNOS(,1,0)
               (00671) *
00BD6 001F0000 (00672)          ADDR     APUSNULL(R7,1)        253 = UNASSIGNED
00BD8 001F0000 (00673)          ADDR     APSSNULL(R7,1)
00BDA 001021FC (00674)          ADDR     CSPUSNOS(,1,0)
               (00675) *
00BDC 001F0000 (00676)          ADDR     APUSNULL(R7,1)        254 = UNASSIGNED
00BDE 001F0000 (00677)          ADDR     APSSNULL(R7,1)
00BE0 001021FC (00678)          ADDR     CSPUSNOS(,1,0)
               (00679) *
00BE2 001F0000 (00680)          ADDR     APUSNULL(R7,1)        255 = UNASSIGNED
00BE4 001F0000 (00681)          ADDR     APSSNULL(R7,1)
00BE6 001021FC (00682)          ADDR     CSPUSNOS(,1,0)
               (00683) *
      00000942 (00684) #L=AFDTSORG+3*2*(143-128)                FCB #143
00942 001E4666 (00685)            ADDR VMOVS(R7,1)
00944 001E4122 (00686)            ADDR V1124S(R7,1)
00946 001021FC (00687)            ADDR CSPUSNOS(,1,0)
               (00688) *
```

DISPATCH TABLE ENTRIES FOR FFTN, FFTNB, FFTNI, FFTNIB

```
                  (00689) 'DISPATCH TABLE ENTRIES FOR FFTN, FFTNB, FFTNI, FFTNIB
                  (00690) ;
                  (00691) ; FFTN AND FFTNI HAVE FULL BINDING
                  (00692) ; FFTNB AND FFTNIB ONLY BIND YBASE AND UBASE
                  (00693) ;
       000000CC  (00694)          FFTN$=204
       000000CD  (00695)          FFTNB$=205
       000000CE  (00696)          FFTNI$=206
       000000CF  (00697)          FFTNIB$=207
                  (00698) ;
                  (00699) ;
                  (00700) ;
       00000AB0  (00701) #L=AFDTSORG+3*WS*(FFTN$-128)            FCB #204
00AB0  001F43A6  (00702)          ADDR CSM2$(R7, 1)
00AB2  001F4564  (00703)          ADDR CSM$(R7, 1)
00AB4  00104276  (00704)          ADDR FFTSSET(, 1, 0)
                  (00705) ;
       00000AB6  (00706) #L=AFDTSORG+3*WS*(FFTNB$-128)           FCB #205
00AB6  001F43A6  (00707)          ADDR CSM2$(R7, 1)
00AB8  001F4564  (00708)          ADDR CSM$(R7, 1)
00ABA  00104352  (00709)          ADDR SBM$FFT(, 1, 0)
                  (00710) ;
       00000ABC  (00711) #L=AFDTSORG+3*WS*(FFTNI$-128)           FCB #206
00ABC  001E4482  (00712)          ADDR ISM2$(R7, 1)
00ABE  001E4564  (00713)          ADDR CSM$(R7, 1)
00AC0  00104276  (00714)          ADDR FFTSSET(, 1, 0)
                  (00715) ;
       00000AC2  (00716) #L=AFDTSORG+3*WS*(FFTNIB$-128)          FCB #207
00AC2  001F4482  (00717)          ADDR ISM2$(R7, 1)
00AC4  001E4564  (00718)          ADDR CSM$(R7, 1)
00AC6  00104352  (00719)          ADDR SBM$FFT(, 1, 0)
                  (00720) *
                  (00721) *
       00004000  (00722)           #L = START                   SET PC TO START LOCATION FOR MODULE
```

```
                    (00723) *       APU3-VSMA1       VECTOR SCALAR MULTIPLY-ADD
                    (00724) *                                  1 VECTOR BINDS TO APS3-V1124
                    (00725) *
                    (00726) *
                    (00727) *
                    (00728) *
                    (00729) *       EQ. Y=A*U+B
                    (00730) *
                    (00731)         EVEN                       START ON WORD BOUNDARY
    04000 0000      (00732)         DATA     SMA1SSA           START ADDRESS
    04001 000E      (00733)         DATA     SMA1SSZ           SIZE
                    (00734) *
                    (00735) VSMA1S BEGIN APU(VSMA1)            START OF APU MODULE
          00000000  (00736)         #A=0                       SET START ADDRESS
                    (00737) *
A00 04002 0BEF0BEF  (00738) SMA1SSA MOV(IQA,M7)                M7=A
A01 04004 0BF70BF7  (00739)         MOV(IQA,A7)                A7=B
                    (00740) *
          00000002  (00741) #1=#A
A02 04006 0BFB0000  (00742)         MOV(IQA,M0) \ NOP          M0=UE
A03 04008 00000BFB  (00743)         NOP \ MOV(IQA,M0)
A04 0400A 84718471  (00744)         MOV(A1),MUL(M0,M7)         A1=PO', PE=UE*A
A05 0400C 473C473C  (00745)         MOV(OO),ADD(A1,A7)         OUT=RE', RO'=PO'+B
A06 0400E 0BF90000  (00746)         MOV(IQA,M1) \ NOP          M1=UO
A07 04010 00000BF9  (00747)         NOP \ MOV(IQA,M1)
A08 04012 84F084F0  (00748)         MOV(A0),MUL(M1,M7)         A0=PE,PO=UO*A
A09 04014 471C471C  (00749)         MOV(OO),ADD(A0,A7)         OUT=RO',RE=PE+B
A0A 04016 901C0002  (00750)         JUMPC(#1,EO)
                    (00751) *
A0B 04018 20320000  (00752)         CLEAR(RA) \ NOP        HALT
                    (00753) *
A0C 0401A 00000000  (00754)         NOP
A0D 0401C 10000000  (00755)        JUMP(0)
                    (00756) *
          0000000E  (00757)         SMA1SSZ=#A-SMA1SSA
                    (00758) *
    0401E           (00759)         END SMA1SSZ
                    (00760)         EVEN
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                     (00761) *     APU3-VCOS        VECTOR COSINE
                     (00762) *
                     (00763) *     BINDS TO APS3-V2134B
                     (00764) *
                     (00765) *     EQ. Y(K) = U(K) * COS(A*V(K)+B*K+C)
                     (00766) *
                     (00767)       EVEN                          START ON WORD BOUNDARY
        0401F 0000   (00768)       DATA VCOSSSA                  START ADDRESS
        0401F 0065   (00769)       DATA VCOSSSZ                  SIZE
                     (00770) *
                     (00771) VCOS$  BEGIN APU(VCOS)              START OF APU MODULE
           00000000  (00772)       #A=0                          SET START ADDRESS
                     (00773) *
                     (00774) *
                     (00775) *     INITIALIZATION PLACES B+C WITHIN RANGE ZERO TO ONE.
                     (00776) *
A00 04020 16801680   (00777) VCOSSSA K(1)                        B=1
A01 04022 16751675   (00778)       MOV(A5),K(.5)                 A5=1,B=1/2
A02 04024 16541654   (00779)       MOV(A4),K(.25)                A4=1/2,B=1/4
A03 04026 08F708F7   (00780)       MOV(IOA,A7)                   A7=B
A04 04028 02F302F3   (00781)       MOV(A3),B(A7)                 A3=1/4,B=B
                     (00782) *
                     (00783) *  DECREMENTATION LOOP ON B
                     (00784) *
A05 0402A 08970897   (00785) #1    MOV(B,A7)                     A7=B
A06 0402C 911F0009   (00786)       JUMPS(VC$2,T1)                GOTO #2 IF B<0
                     (00787) *
A07 0402E 40F040F0   (00788)       SUB(A7,A5)                    B=B-1
A08 04030 10000005   (00789)       JUMP(#1)                      REPEAT DECR PROCESS
                     (00790) *
                     (00791) *  INCREMENTATION LOOP ON B
                     (00792) *
A09 04032 08900890   (00793) VC$2  MOV(B,A0)                     A0=B(NEG)
A0A 04034 45F745F7   (00794)       MOV(A7),ADD(A7,A5)            A7=B(NEG),B=B+1
A0B 04036 08800880   (00795)       MOV(B,NULL)                   COMPLETE T1 FLAG UPDATE
A0C 04038 911F0009   (00796)       JUMPS(VC$2,T1)                REPEAT IF B+1 NEGATIVE
                     (00797) *
                     (00798) *  CONTINUE FOR A7=B, A0=B,WHERE -1<B<0
                     (00799) *
A0D 0403A 47F047F0   (00800)       ADD(A7,A7)                    B=-2<2B<0
                     (00801) *
A0E 0403C 45F745F7   (00802) VCSB    MOV(A7),ADD(A7,A5)          A7=-2<2B<0;B=-1<2B<1
A0F 0403F 08800880   (00803)         MOV(B,NULL)                 COMPLETE T1 UPDATE
A10 04040 911F000E   (00804)         JUMPS(VCSB,T1)              REPEAT IF B=-1<2B<0
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                            (00805) *
                            (00806) *CONTINUE WITH A7=2B WHERE -1<2B<0
                            (00807) *
 A11 04042 0BF60BF6 (00808)         MOV(IOA,A6)              A6=C
 A12 04044 02C002C0 (00809)         R(A6)                    R=C
                            (00810) *
                            (00811) *  DECREMENTATION LOOP ON C
                            (00812) *
 A13 04046 08960896 (00813) VCS3  MOV(R,A6)                  A6=C
 A14 04048 911E0017 (00814)         JUMPS(VCS4,T1)           GO TO #4 OF C<0
                            (00815) *
 A15 0404A 4DC04DC0 (00816)         SUB(A6,A5)               R=C-1
 A16 0404C 10000013 (00817)         JUMP(VCS3)               REPEAT DECR PROCESS
                            (00818) *
                            (00819) *  INCREMENTATION LOOP ON C
                            (00820) *
 A17 0404E 45D645D6 (00821) VCS4  MOV(A6),ADD(A6,A5)         A6=C, R=C+1
 A18 04050 08800880 (00822)         MOV(R,NULL)              COMPLETE T1 FLAG UPDATE
 A19 04052 911E0017 (00823)         JUMPS(VCS4,T1)           REPEAT IF C+1 NEGATIVE
                            (00824) *
                            (00825) *  CONTINUE FOR A6=C, WHERE -1<C<0
                            (00826) *
 A1A 04054 4FC04BC0 (00827) VCS5  SUB(A6,A7)\SUB(A6,A0)      R=-1<C-2B<1;R=-1<C-B<1
 A1B 04056 5DD65DD6 (00828)         MOV(A6),ADDLT(A6,A5)     A6=C-2B,C-B;R=0<C-2B<1,R=0<C-B<1
 A1C 04058 08960896 (00829)         MOV(R,A6)                A6=0<C-2B<1,0<C-B<1;
                            (00830) *
                            (00831) *
                            (00832) * END OF INITIALIZATION*
                            (00833) *
                            (00834) *
                            (00835) *  INPUT/OUTPUT PARAMETERS AND COMPUTE ARGUMENT OF COSINE
                            (00836) *    ENTER LOOP WITH K=0
                            (00837) *
 A1D 0405A 47C847C8 (00838) VCS6  MOV(M0),ADD(A6,A7)         M0=R23'; R1=(4K+1)B+C
 A1E 0405C 84328432 (00839)         MOV(A2),MUL(M0,M5)       A2=P12'; P13'=R23'*U(4K-4), R23'*U(4K-3)
 A1F 0405E 0BFF0BFF (00840)         MOV(IOA,M7)              M7=A
 A20 04060 5D105D10 (00841)         MOV(A0),ADDLT(A0,A5)     A0=R1, R2=R1+T(1)=0<-((4KK)B+C),((4K+1)B+C)<1
 A21 04062 08EB0000 (00842)         MOV(IOA,M3) \ NOP         M3=V(2K)
 A22 04064 00000BEB (00843)         NOP \ MOV(IOA,M3)         M3=V(4K+1)
 A23 04066 42304230 (00844)         MOV(A0),ADD(A1,A2)       A0=R2,R24'=C0+P12'
 A24 04068 85ED85ED (00845)         MOV(M5),MUL(M3,M7)       M5=P13'; P1=V(4K)*A,V(4K+1)*A
 A25 0406A 470C470C (00846)         MOV(M4),ADD(A0,A7)       M4=R24', R3=R2+B(=(4K+2)B+C),(=(4K+3)B+C)
 A26 0406C 5DD65DD6 (00847)         MOV(A6),ADDLT(A6,A5)     A6=R3, R4=R3+T(1)=0<-((4K+2)B+C),((4K+3)B+C)<1
 A27 0406E 84918491 (00848)         MOV(A1),MUL(M1,M4)       A1=P1; P14'=U(4K+2)*R24'U(4K+3)*R24'
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A28 04070 4C164C16 (00849)       MOV(A6),SUB(A0,A4)        A6=R4,R5=R2-1/2 (-1/2<R5<1/2)
A29 04072 08F80000 (00850)       MOV(IOA,M3) \ NOP         M3=V(2K+1)
A2A 04074 000008F8 (00851)       NOP \ MOV(IOA,M3)         M3=V(4K+3)
A2B 04076 41104110 (00852)       MOV(A0),ADD(A0,A1)        A0=R5, R6=R2+P1
A2C 04078 85F985F9 (00853)       MOV(M1),MUL(M3,M7)        M1=P14'; P2=V(4K+2)*A,V(4K+3)*A
A2D 0407A 5D105D10 (00854)       MOV(A0),ADDLT(A0,A5)      A0=R6, R7=R6+T(1)
A2E 0407C 4C104C10 (00855)       MOV(A0),SUB(A0,A4)        A0=R7, R8=R7-1/2 (=CARG(4K)),(=CARG(4K+1))
A2F 0407E 85318531 (00856)       MOV(A1),MUL(M2,M5)        A1=P2;P15'=Y(4K+4),Y(4K-3)
A30 04080 12101210 (00857)       MOV(A0),ABS(A0)           A0=R3, R=ABS(R8) 0<CARG(2K)21/2
                   (00858) *                                   0<CARG(4K+1)<1/2
A31 04082 48704870 (00859)       MOV(A0),SUB(A3,A0)        A0=R9,R10=1/4,-R9, -1/4<SARG(4K)<1/4
                   (00860) *                                   -1/4<SARG(4K+1)<1/4
A32 04084 84DC84DC (00861)       MOV(OQ),MUL(M1,M6)        OQ=Y(4K-4),Y(4K-3);P6=Y(4K-2),Y(4K-1)
A33 04086 08RA08RA (00862)       MOV(R,M2)                 M2=SARG(4K)(=X(4K)),SARG(4K+1)(=X(4K+1))
A34 04088 4CCF4CCF (00863)       MOV(M7),SUB(A6,A4)        M7=X(4K),X(4K+1);,R11=R4-1/2
A35 0408A 41104110 (00864)       MOV(A0),ADD(A0,A1)        A0=R11, R12=R11+P2
A36 0408C 857C857C (00865)       MOV(OQ),MUL(M2,M7)        OQ=Y(4K-2),Y(4K-1);P3=X(4K)^2,X(4K+1)^2
A37 0408E 911C0061 (00866)       JUMPS(VCS7,E0)            EXIT
                   (00867) *
                   (00868) *
                   (00869) *  FETCH COEFFIECIENTS AND EVALUATE POLYNOMINAL APPROX.
                   (00870) *  VIA HORNER METHOD
                   (00871) *
                   (00872) *
A38 04090 5D105D10 (00873)       MOV(A0),ADDLT(A0,A5)      A0=R12, R13=R12+T(1)
A39 04092 08C808C8 (00874)       MOV(IQ,M0)                M0=C4
A3A 04094 4C104C10 (00875)       MOV(A0),SUB(A0,A4)        A0=R13, R14=R13-1/2 (=CARG(4K+2)
                   (00876) *                               CARG(4K+3)
A3B 04096 08AF08AF (00877)       MOV(P,M7)                 M7=X(4K)^2,X(4K+1)^2
A3C 04098 84608460 (00878)       MUL(M0,M7)                P4=C4*X(4K)^2,C4*X(4K+1)^2
A3D 0409A 12101210 (00879)       MOV(A0),ABS(A0)           A0=R14, R15=ABS(R14) (0<CARG(4K+2)
                   (00880) *                               CARG(4K+3)<1/2)
A3E 0409C 08FC08FC (00881)       MOV(IOA,M4)               M4=C4
A3F 0409E 48704870 (00882)       MOV(A0),SUB(A3,A0)        A0=R15,R16=1/4-R15 (-1/4<SARG(4K+2)
                   (00883) *                               SARG(4K+3)<1/4)
A40 040A0 088E088E (00884)       MOV(R,M6)                 M6=SARG(4K+2)(=X(4K+2))
                   (00885) *                               SARG(4K+3)(=X(4K+3))
A41 040A2 088B088B (00886)       MOV(R,M3)                 M3=X(4K+2),X(4K+3)
A42 040A4 85D285D2 (00887)       MOV(A2),MUL(M3,M6)        A2=C4*X(4K)^2,C4*X(4K+1)^2,P5=X(4K+2)^2
                   (00888) *                               X(4K+3)^2
A43 040A6 08F008F0 (00889)       MOV(IOA,A0)               A0=C3
A44 040A8 40404040 (00890)       ADD(A2,A0)                R17=C3+C4*X(4K)^2,C3+C4*X(4K+1)^2
A45 040AA 08AB08AB (00891)       MOV(P,M3)                 M3=X(4K+2)^2,X(4K+3)^2
A46 040AC 85808580 (00892)       MUL(M3,M4)                P6=C4*X(4K+2)^2,X(4K+3)^2
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A47 040AF 088808888 (00893)      MOV(R,M0)              M0=R7
A48 040B0 08F108F1 (00894)       MOV(IOA,A1)            A1=C2
A49 040B2 84728472 (00895)       MOV(A2),MUL(M0,M7)     A2=P6;P7=R11*X(4K)^2,R11*X(4K+1)^2
A4A 040B4 40404040 (00896)       ADD(A2,A0)             R18=C3+C4*X(4K+2)^2,C3+C4*X(4K+3)^2
A4B 040B6 088C088C (00897)       MOV(R,M4)              M4=R18
A4C 040B8 85928592 (00898)       MOV(A2),MUL(M3,M4)     A2=P7;P8=X(4K+2)^2*R18,X(4K+3)^2*R18
A4D 040BA 41404140 (00899)       ADD(A2,A1)             R19=P7+C2
A4E 040BC 08F008F0 (00900)       MOV(IOA,A0)            A0=C1
A4F 040BE 08880888 (00901)       MOV(R,M0)              M0=R19
A50 040C0 84728472 (00902)       MOV(A2),MUL(M0,M7)     A2=P8;P9=R19*X(4K)^2,R19*X(4K+1)^2
A51 040C2 41404140 (00903)       ADD(A2,A1)             R20=P8+C2
A52 040C4 088C088C (00904)       MOV(R,M4)              M4=R20
A53 040C6 85928592 (00905)       MOV(A2),MUL(M3,M4)     A2=P9;P10=X(4K+2)^2*R20,X(4K+3)^2*R20
A54 040C8 40404040 (00906)       ADD(A2,A0)             R21=P9+C1
A55 040CA 08F108F1 (00907)       MOV(IOA,A1)            A1=C0
A56 040CC 08880888 (00908)       MOV(R,M0)              M0=R21
A57 040CE 84728472 (00909)       MOV(A2),MUL(M0,M7)     A2=P10;P11=R21*X(4K)^2,R21*X(4K+1)^2
A58 040D0 40404040 (00910)       ADD(A2,A0)             R22=P10+C1
A59 040D2 08ED0000 (00911)       MOV(IOA,M5) \ NOP      M5=U(4K)
A5A 040D4 000008ED (00912)       NOP \ MOV(IOA,M5)      M5=U(4K+1)
A5B 040D6 08E90000 (00913)       MOV(IOA,M1) \ NOP      M1=U(4K+1)
A5C 040D8 000008E9 (00914)       NOP \ MOV(IOA,M1)      M1=U(4K+3)
A5D 040DA 088C088C (00915)       MOV(R,M4)              M4=R22
A5E 040DC 85928592 (00916)       MOV(A2),MUL(M3,M4)     A2=P11;P12=X(4K+2)^2*R22,X(4K+3)^2*R22
A5F 040DE 41404140 (00917)       ADD(A2,A1)             R23=P11+C0(=SIN(4K)),C=SIN((4K+1))
A60 040E0 1000001D (00918)       JUMP(VCS6)             GO TO TOP OF LOOP
                   (00919) *
                   (00920) *   EXIT
                   (00921) *
A61 040E2 088C088C (00922) VCS7  MOV(P,00)
A62 040E4 20322032 (00923)       CLEAR(RA)
A63 040E6 00000000 (00924)       NOP
A64 040E8 10000000 (00925)       JUMP(0)
                   (00926) *
          00000065 (00927)       VCOS$SZ=#A-VCOS$SA
                   (00928) *
    040EA          (00929)       END VCOS$SZ
                   (00930)       EVEN
                   (00931) *
                   (00932) *  SPECIAL CONSTANTS TABLE
                   (00933) *
    040EA 130AFF42 (00934) VCOSCS:      DATA   39.71091766     C4
    040EC A6499942 (00935)              DATA   -76.57499214    C3
    040EE 28CD15C2 (00936)              DATA   81.60223119     C2
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040F0 94ABBC42 (00937)             DATA -41.34167750      C1
040F2 3243F6C1 (00938)             DATA  6.283185272      C0
               (00939) *
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                         (00940) '      APU3-VFLT
                         (00941) *
                         (00942) *  VECTOR VECTOR FLOAT(VFLT, VFLTB)
                         (00943) *
                         (00944) *  BINDS TO APS3-V1124A FOR VFLT AND V1124C FOR VFLTB
                         (00945) *
                         (00946) *  EQ.  Y=NORM(U)+B
                         (00947) *
                         (00948)        EVEN                    START ON WORD BOUNDARY
     040F4 0000          (00949)        DATA VFLTSSA            START ADDRESS
     040F5 0012          (00950)        DATA VFLTSSZ            SIZE
                         (00951) *
                         (00952) VFLTS BEGIN APU(VFLT)          START OF APU MODULE
           00000000      (00953)        #A=0
                         (00954) *
A00 040F6 08FF08FF       (00955) VFLTSSA  MOV(IOA,M7)           M7=A
A01 040F8 08F708F7       (00956)        MOV(IOA,A7)             A7=B
                         (00957) *
           00000002      (00958)        #1=#A
A02 040FA 08F20000       (00959)        MOV(IOA,A2) \ NOP       A2=UEE/
A03 040FC 000008F2       (00960)        NOP \ MOV(IOA,A2)              A2=UEE
A04 040FE 325C325C       (00961)        MOV(OQ),NORM(A2)        OUT=RE',R=NORM(UEF)=UE
A05 04100 08880888       (00962)        MOV(R,M0)               M0=UE
A06 04102 84718471       (00963)        MOV(A1),MUL(M0,M7)      A1=PO',PE=UE*A
A07 04104 47204720       (00964)        ADD(A1,A7)              RO'=PO'+B
A08 04106 08F30000       (00965)        MOV(IOA,A3) \ NOP       A3=UOO/
A09 04108 000008F3       (00966)        NOP \ MOV(IOA,A3)              A3=UOO
A0A 0410A 327C327C       (00967)        MOV(OQ),NORM(A3)        OUT=RO',R=NORM(UOO)=UO
A0B 0410C 08890889       (00968)        MOV(R,M1)               M1=UO
A0C 0410E 84F084F0       (00969)        MOV(A0),MUL(M1,M7)      A0=PE,PO=UO*A
A0D 04110 47004700       (00970)        ADD(A0,A7)              RE=PE+B
A0E 04112 901C0002       (00971)        JUMPC(#1,EQ)
                         (00972) *
A0F 04114 20320000       (00973)        CLEAR(RA) \ NOP         HALT
                         (00974) *
A10 04116 00000000       (00975)        NOP
A11 04118 10000000       (00976)        JUMP(0)
                         (00977) *
           00000012      (00978)        VFLTSSZ=#A-VFLTSSA
                         (00979) *
     0411A               (00980)        END VFLTSSZ
                         (00981)        EVEN
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                         (00982) '       APS3-V1124
                         (00983) *
                         (00984) *
                         (00985) * INPUT STREAM - SA, SB;UK; FI
                         (00986) * OUTPUT STREAM - D1,D2,D3,D4; YK; EO
                         (00987) *
                         (00988) *
                         (00989) * START OF HEADER BLOCK
                         (00990) *
                         (00991)          EVEN                     START ON WORD BOUNDRY
    0411A 0000416C (00992)          ADDR V1124$I             PTR TO CONSTR INSTR BLOCK
    0411C 00004126 (00993)          ADDR V1124$+2*V1124$S    PTR TO SCALAR BLOCK
    0411E 0002     (00994)          DATA 2                   NUMBER OF SCALARS
    0411F 0062     (00995)          DATA V1124$Z             MODULE SIZE
    04120 00004164 (00996)          ADDR V1124$A             PTR TO CHAIN ANCHOR
                         (00997)          EVEN                     END OF WORD BOUNDRY
                         (00998) *
                         (00999) *
                         (01000) V1124$   BEGIN APS(V1124)
                         (01001) *
                         (01002) *
                         (01003) * INPUT PROGRAM
                         (01004) *
                         (01005) *
A00 04122 00201240 (01006) #1       JSN(V1124$3,P2)          SET OUTPUT PC
A01 04124 02300030 (01007)          SET(R0)                  TURN ON APU
                         (01008) *
A02 04126 04C20000 (01009) V1124$S  LOAD(BR0,MSS(1),TF)      GEN SA ADDR
A03 04128 06C20000 (01010)          LOAD(BR0,MSS(1),TF)      GEN SB ADDR
A04 0412A 08401000 (01011)          LOAD(BR0,[1])            LOAD VECTOR-U BASE ADDR
A05 0412C 0A600000 (01012)          LOAD(BR2,MSS)            LOAD VECTOR-U SIZE-1
A06 0412E 0C020000 (01013)           SUB(BR0,MSS)            SET BR0 TO U BASE-SPACING
A07 04130 0E290C79 (01014)          ADDL(BR2,1),JUMP(V1124$5)  ENTER LOOP AT TEST
                         (01015) *
                         (01016) * INPUT ADDRESS GENERATION LOOP
                         (01017) *
A08 04132 108A9008 (01018) #2       ADD(BR0,[9],TF)          GEN U-ELEMENT ADDRESS
A09 04134 128A9002 (01019)          ADD(BR0,[9],TF)
A0A 04136 148A9002 (01020)          ADD(BR0,[9],TF)
A0B 04138 168A9002 (01021)          ADD(BR0,[9],TF)
                         (01022) *
A0C 0413A 18290884 (01023) V1124$5  SUBL(BR2,4),JUMPP(#2)    LOOP UNTIL CNTR NEG
                         (01024) *
A0D 0413C 1A2910FB (01025)          ADDL(BR2,3),JUMPN(V1124$7)  SET UP CLEAN-UP LOOP
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```
                     (01026) *
 A0F 0413F 1CHA9006  (01027) #6         ADD(BR0,[9],TF)                GEN LAST 1-3 U-ADDR
 A0F 04140 1F290FB1  (01028)            SUBL(BR2,1),JUMPP(#6)          LOOP UNTIL FINISHED
                     (01029) *
 A10 04142 20200031  (01030) V1124$7    CLEAR(RI)                      HALT INPUT
 A11 04144 22000020  (01031)            NOP(0)
                     (01032) *
                     (01033) *
                     (01034) * OUTPUT PROGRAM
                     (01035) *
 A12 04146 24300032  (01036) V1124$3    SET(RA)                        TURN-ON APU
 A13 04148 26C20794  (01037)            LOAD(BW0,DMYS(1),TF)           GEN DUMMY-1 ADDRESS
 A14 0414A 28C20794  (01038)            LOAD(BW0,DMYS(1),TF)
 A15 0414C 2AC20794  (01039)            LOAD(BW0,DMYS(1),TF)
 A16 0414E 2CC20794  (01040)            LOAD(BW0,DMYS(1),TF)           GEN DUMMY-4 ADDR
 A17 04150 2E400012  (01041)            LOAD(BW0,[0])                  LOAD VECTOR-Y BASE ADDR
 A18 04152 30500000  (01042)            LOAD(BW1,M$S)                  LOAD VECTOR-Y SIZE-1
 A19 04154 32020000  (01043)            SUB(BW0,M$S)                   SET BW0 TO Y BASE-SPACING
 A1A 04156 34111F79  (01044)            ADDL(BW1,1),JUMP(V1124$8)      ENTER LOOP AT TEST
                     (01045) *
                     (01046) * OUTPUT ADDRESS GENERATION LOOP
                     (01047) *
 A1B 04158 36RAR008  (01048) #4         ADD(BW0,[8],TF)                GEN Y-ELEMENT ADDR
 A1C 0415A 38RAR002  (01049)            ADD(BW0,[8],TF)
 A1D 0415C 3ARAR002  (01050)            ADD(BW0,[8],TF)
 A1E 0415E 3CRAR002  (01051)            ADD(BW0,[8],TF)
                     (01052) *
 A1F 04160 3E111BB4  (01053) V1124$8    SUBL(BW1,4),JUMPP(#4)          LOOP UNTIL NEG
                     (01054) *
 A20 04162 401123FB  (01055)            ADDL(BW1,3),JUMPN(V1124$0)     SET UP CLEAN-UP LOOP
                     (01056) *
 A21 04164 42RAR006  (01057) #9           ADD(BW0,[8],TF)              GEN LAST 1-3 Y-ADDR
 A22 04166 441121B1  (01058)              SUBL(BW1,1),JUMPP(#9)        LOOP UNTIL FINISHED
                     (01059) *
 A23 04168 46200030  (01060) V1124$0    CLEAR(RO)                      HALT OUTPUT
 A24 0416A 48000020  (01061)            NOP(0)
                     (01062) *
                     (01063) *
           00004164  (01064) V1124$A=#C                             ASSIGN VALUE TO CHAIN ANCHOR
                     (01065) *
     0416C           (01066)              END #A-1                  END OF MODULE
                     (01067) *
                     (01068) *
                     (01069) * STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
```

```
                  (01070) *
                  (01071) *
0416C 00000000 (01072) V1124$I DATA      12F'0.0'
 ...
                  (01073) *
                  (01074) *
      00000062 (01075) V1124$Z=*L-V1124$                         COMPUTE MODULE SIZE
```

```
*** *** ARITH. MODULES - PROG. #830101.03 MAY 7, 1980
*-V1124A        APS PGM FOR VELT

                     (01076) *       APS3-V1124A        APS PGM FOR VELT
                     (01077) *
                     (01078) *
                     (01079) * INPUT STREAM  - SA, SB; UK FIXED LONG; EI
                     (01080) * OUTPUT STREAM - D1,D2,D3,D4; VK; EO
                     (01081) *
                     (01082) *
                     (01083) *
                     (01084) *
                     (01085) * START OF HEADER BLOCK
                     (01086) *
                     (01087)            EVEN                         START ON WORD BOUNDARY
    04184 00004106   (01088)            ADDR V1124AS1                PTR TO CONSTR INSTR BLOCK
    04186 00004190   (01089)            ADDR V1124AS+2*V1124ASS      PTR TO SCALAR BLOCK
    04188 0002       (01090)            DATA 2                       NUMBER OF SCALARS
    04189 0062       (01091)            DATA V1124ASZ                MODULE SIZE
    0418A 000041CF   (01092)            ADDR V1124ASA                PTR TO CHAIN ANCHOR
                     (01093)            EVEN                         END OF WORD BOUNDRY
                     (01094) *
                     (01095) *
                     (01096) V1124AS     BEGIN APS(V1124A)
                     (01097) *
                     (01098) *
                     (01099) * INPUT PROGRAM
                     (01100) *
A00 0418C 00201240   (01101) #1         JSN(V1124AS3,P2)             SET OUTPUT PC
A01 0418E 02300030   (01102)            SET(PO)                      TURN ON OUTPUT
                     (01103) *
A02 04190 04C20000   (01104) V1124ASS  LOAD(BR0,MSS(1),TF)          GEN SA ADDRESS - COEF A
A03 04192 06F20000   (01105)            LOAD(BR3,MSS(1),TF)          GEN SB ADDR, SAVE
A04 04194 08401000   (01106)            LOAD(BR0,[1])                LOAD VECTOR-U BASE ADDR-LONG
A05 04196 0A600000   (01107)            LOAD(BR2,MSS)                LOAD VECTOR-U SIZE-1
A06 04198 0C020000   (01108)            SUB(BR0,MSS)                 SET BR0 TO U BASE-SPACING
A07 0419A 0F290C79   (01109)            ADDL(BR2,1),JUMP(V1124AS5)   ENTER LOOP AT TEST
                     (01110) *
                     (01111) * INPUT ADDRESS GENERATION LOOP
                     (01112) *
A08 0419C 110A9008   (01113) #2         ADD(BR0,[9],TF)              GEN U-ELEMENT ADDR FIXED-LONG
A09 0419E 130A9002   (01114)            ADD(BR0,[9],TF)
A0A 041A0 150A9002   (01115)            ADD(BR0,[9],TF)
A0B 041A2 170A9002   (01116)            ADD(BR0,[9],TF)
                     (01117) *
A0C 041A4 18290884   (01118) V1124AS5  SUBL(BR2,4),JUMPP(#2)        LOOP UNTIL CNTR NEG
                     (01119) *
```

```
A0D 041A6 1A2910E6 (01120)             ADDL(BR2,3),JUMPN(V1124AS7)  SET UP CLEAN-UP LOOP
                   (01121) *
A0E 041A8 1D0A9006 (01122) #6          ADD(BR0,[9],TF)              GEN LAST 1-3 D-ADDR
A0F 041AA 1F290E81 (01123)             SUBL(BR2,1),JUMPP(#6)        LOOP UNTIL FINISHED
                   (01124) *
A10 041AC 20200031 (01125) V1124AS7    CLEAR(RI)                    HALT INPUT
A11 041AE 22000020 (01126)             NOP(0)
                   (01127) *
                   (01128) * OUTPUT PROGRAM
                   (01129) *
A12 041B0 24300032 (01130) V1124AS3    SET(RA)                      TURN-ON APU
A13 041B2 26C20794 (01131)             LOAD(BW0,DMYS(1),TF)         GEN DUMMY-1 ADDR
A14 041B4 28C20794 (01132)             LOAD(BW0,DMYS(1),TF)         GEN DUMMY-2 ADDR
A15 041B6 2AC20794 (01133)             LOAD(BW0,DMYS(1),TF)
A16 041B8 2CC20794 (01134)             LOAD(BW0,DMYS(1),TF)         GEN DUMMY-4 ADDR
A17 041BA 2E400012 (01135)             LOAD(BW0,[0])                LOAD VECTOR-Y BASE ADDR
A18 041BC 30500000 (01136)             LOAD(BW1,MSS)                LOAD VECTOR-Y SIZE-1
A19 041BE 32020000 (01137)             SUB(BW0,MSS)                 SET BW0,TO YBASE-SPACING
A1A 041C0 34111F79 (01138)             ADDL(BW1,1),JUMP(V1124AS8)   ENTER LOOP AT TEST
                   (01139) *
                   (01140) *
                   (01141) *  OUTPUT GENERATION LOOP
                   (01142) *
A1B 041C2 368AB00B (01143) #4          ADD(BW0,[B],TF)              GEN Y-ELEMENT ADDR
A1C 041C4 388AB002 (01144)             ADD(BW0,[B],TF)
A1D 041C6 3ABAB002 (01145)             ADD(BW0,[B],TF)
A1E 041C8 3CBAB002 (01146)             ADD(BW0,[B],TF)
                   (01147) *
A1F 041CA 3E111BB4 (01148) V1124AS8    SUBL(BW1,4),JUMPP(#4)        LOOP UNTIL CNTR NEG
                   (01149) *
A20 041CC 401123EB (01150)             ADDL(BW1,3),JUMPN(V1124AS0)  SET UP CLEAN-UP LOOP
                   (01151) *
A21 041CE 42BAB006 (01152) #9          ADD(BW0,[B],TF)              GEN LAST 1-3 Y-ADDR
A22 041D0 441121B1 (01153)             SUBL(BW1,1),JUMPP(#9)        LOOP UNTIL FINISHED
                   (01154) *
A23 041D2 46200030 (01155) V1124AS0    CLEAR(RO)                    HALT OUTPUT
A24 041D4 48000020 (01156)             NOP(0)
                   (01157) *
                   (01158) *
                   (01159) *
          000041CE (01160) V1124ASA=#C                              ASSIGN VALUE TO CHAIN ANCHOR
                   (01161) *
    041D6          (01162)             END #A-!                     END OF MODULE
                   (01163) *
```

```
                   (01164) * STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
                   (01165) *
                   (01166) *
041D6 00000000 (01167) V1124AS1 DATA     12F'0.0'
 ...
                   (01168) *
                   (01169) *
      00000062 (01170) V1124ASZ=*1-V1124AS                         COMPUTE MODULE SIZE
```

```
                          (01171) *       APS3-V2134B        APS PGM FOR VCOS
                          (01172) *
                          (01173) *
                          (01174) * INPUT STREAM - SB,SC; SA,V(4K),...V(4K+3),C4...C0,U(4K),...U(4K+3);FI
                          (01175) * OUTPUT STREAM - D1,D2,D3,D4; YK; FO
                          (01176) *
                          (01177) *
                          (01178) * START OF HEADER BLOCK
                          (01179) *
                          (01180)            EVEN                            START ON WORD BOUNDRY
      041EE 00004256 (01181)            ADDR V2134BS1                   PTR TO CONSTR INSTR BLOCK
      041F0 000041FA (01182)            ADDR V2134BS+2*V2134BSS         PTR TO SCALAR BLOCK
      041F2 0003     (01183)            DATA 3                          NUMBER OF SCALARS
      041F3 0080     (01184)            DATA V2134BSZ                   MODULE SIZE
      041F4 0000424E (01185)            ADDR V2134BSA                   PTR TO CHAIN ANCHOR
                          (01186)            EVEN                            END OF WORD BOUNDRY
                          (01187) *
                          (01188) *
                          (01189) V2134BS    BEGIN APS(V2134B)
                          (01190) *
                          (01191) *
                          (01192) * INPUT PROGRAM
                          (01193) *
                          (01194) *
 A00 041F6 00201D40 (01195) #1         JSN(V2134BS3,P2)                SET OUTPUT PC
 A01 041F8 02300030 (01196)            SET(RO)                         TURN ON APU
                          (01197) *
 A02 041FA 04720000 (01198) V2134BSS  LOAD(BR3,MSS(1))                GET SA ADDR SAVE
 A03 041FC 06C20000 (01199)            LOAD(BRO,MSS(1),TF)             GEN SB ADDR
 A04 041FE 08C20000 (01200)            LOAD(BRO,MSS(1),TF)             GEN SC ADDR
 A05 04200 0A310017 (01201)            MOVB(BW3,BR3)                   SA ADDR IN BW3
 A06 04202 0C401000 (01202)            LOAD(BRO,[1])                   LOAD VECTOR-U BASE ADDR
 A07 04204 0E600000 (01203)            LOAD(BR2,MSS)                   LOAD VECTOR-U SIZE-1
 A08 04206 10020000 (01204)            SUB(BRO,MSS)                    SET BRO TO U BASE-SPACING
 A09 04208 12502006 (01205)            LOAD(BR1,[2])                   LOAD VECTOR-V BASE ADDR
 A0A 0420A 14600000 (01206)             LOAD(BR2,*SS)                  LOAD(VECTOR-V SIZE-1
 A0B 0420C 16120000 (01207)             SUB(BR1,MSS)                   SET BR1 TO V BASE-SPACING
                          (01208) *
                          (01209) *
                          (01210) * INPUT ADDRESS GENERATION LOOP
                          (01211) *
 A0C 0420E 18890016 (01212) #2         MOVB(BR3,BW3,TF)                GEN SA ADDR
 A0D 04210 1A9AA008 (01213)            ADD(BR1,[10],TF)                GEN V-ELEMENT ADDRESS
 A0E 04212 1C9AA002 (01214)            ADD(BR1,[10],TF)
```

```
 A0F 04214 1E9AA002 (01215)            ADD(BR1,[10],TF)               GEN V-ELEMENT ADDR
 A10 04216 209AA002 (01216)            ADD(BR1,[10],TF)
 A11 04218 22F240FA (01217)            LOAD(BR3,VCOSCS(1),TF)         GEN VCSC4 ADDR
 A12 0421A 24B9003A (01218)            ADDL(BR3,2,TF)
 A13 0421C 26B9003A (01219)            ADDL(BR3,2,TF)
 A14 0421E 28B9003A (01220)            ADDL(BR3,2,TF)
 A15 04220 2AB9003A (01221)            ADDL(BR3,2,TF)                 GEN VCSCO ADDRESS
 A16 04222 2CBA900C (01222)            ADD(BR0,[9],TF)                GEN U-ELEMENT ADDR
 A17 04224 2EBA9002 (01223)            ADD(BR0,[9],TF)
 A18 04226 30BA9002 (01224)            ADD(BR0,[9],TF)
 A19 04228 32BA9002 (01225)            ADD(BR0,[9],TF)
 A1A 0422A 34290CB4 (01226)            SUBL(BR2,4),JUMPP(#2)          LOOP UNTIL FINISHED
                    (01227) *
 A1B 0422C 36200031 (01228)            CLEAR(R1)
 A1C 0422E 38000020 (01229)            NOP(0)
                    (01230) *
                    (01231) * OUTPUT PROGRAM
                    (01232) *
 A1D 04230 3A300032 (01233) V2134BS3   SET(RA)                        TURN-ON APU
 A1E 04232 3CC20794 (01234)            LOAD(BW0,DMYS(1),TF)           GEN DUMMY-1 ADDR
 A1F 04234 3EC20794 (01235)            LOAD(BW0,DMYS(1),TF)
 A20 04236 40C20794 (01236)            LOAD(BW0,DMYS(1),TF)
 A21 04238 42C20794 (01237)            LOAD(BW0,DMYS(1),TF)
 A22 0423A 44400012 (01238)            LOAD(BW0,[0])                  LOAD VECTOR-Y BASE ADDR
 A23 0423C 46500000 (01239)            LOAD(BW1,MSS)                  LOAD(VECTOR-Y SIZE-1
 A24 0423E 48020000 (01240)            SUB(BW0,MSS)                   SET BW0 TO Y BASE-SPACING
 A25 04240 4A112A79 (01241)            ADDL(BW1,1),JUMP(V2134BS8)     ENTER LOOP AT TEST
                    (01242) *
                    (01243) *
                    (01244) *OUTPUT ADDRESS GENERATION LOOP
                    (01245) *
 A26 04242 4CBAB008 (01246) #4         ADD(BW0,[8],TF)                GEN Y-ELEMENT ADDRESS
 A27 04244 4EBAB002 (01247)            ADD(BW0,[8],TF)
 A28 04246 50BAB002 (01248)            ADD(BW0,[8],TF)
 A29 04248 52BAB002 (01249)            ADD(BW0,[8],TF)
                    (01250) *
 A2A 0424A 541126B4 (01251) V2134BS8   SUBL(BW1,4),JUMPP(#4)          LOOP UNTIL CNTR NEG
                    (01252) *
 A2B 0424C 56112FFB (01253)            ADDL(BW1,3),JUMPN(V2134BS0)    SET UP CLEAN-UP LOOP
                    (01254) *
 A2C 0424E 58BAB006 (01255) #9         ADD(BW0,[8],TF)                GEN LAST 1-3 Y-ADDR
 A2D 04250 5A112CB1 (01256)            SUBL(BW1,1),JUMPP(#9)          LOOP UNTIL FINISHED
                    (01257) *
 A2E 04252 5C200030 (01258) V2134BS0   CLEAR(R0)                      HALT OUTPUT
```

```
 A2F 04254 5E000020 (01259)           NOP(0)
                    (01260) *
                    (01261) *
                    (01262) *
           0000424E (01263) V2134B$A=$C                          ASSIGN VALUE TO CHAIN ANCHOR
                    (01264) *
     04256          (01265)             END #A-1                 END OF MODULE
                    (01266) *
                    (01267) *
                    (01268) * STORAGE BLOCK FOR CONSTRUCTED INSTRUCTIONS
                    (01269) *
                    (01270) *
     04256 00000000 (01271) V2134BS1 DATA     16F'0.0'
      ...
                    (01272) *
                    (01273) *
           00000080 (01274) V2134BSZ=$L-V2134B$                  COMPUTE MODULE SIZE
```

```
(01275) 'MAP-300 EXTENDED ARRAY FUNCTIONS - PROG. #R30102.03 - MAY 7, 1980
(01276) *
(01277) *
(01278) *
```

```
!NOT-IN-PLACE FFT FOR ONE AND TWO DIMENSIONS
*
*
!FAST FOURIER TRANSFORM AND INVERSE TRANSFORM ALGORITHMS
;
; PERFORMS AN N POINT FFT OR IFFT ON DATA STORED IN
; THE U BUFFER USING THE V BUFFER AS THE
; COSINE TABLE AND THE W BUFFER AS A
; WORKING BUFFER AND LEAVES THE RESULT IN THE
; Y BUFFER.  THIS ROUTINE CANNOT BE DONE IN
; PLACE (I.E. W AND U CAN'T BE THE SAME BUF-
; FER).  THE NUMBER OF POINTS IN THE FFT,
; N, MUST BE A POWER OF TWO AND NOT GREATER
; THAN 1024.
;
;
; THE BUFFER DESCRIPTIONS ARE:
;   Y BUFFER (10-39)  COMPLEX 32-BIT FLOATING POINT
;   U BUFFER (10-39)  COMPLEX 32-BIT FLOATING POINT
;   V BUFFER (10-39)  REAL 32-BIT FLOATING POINT
;   W BUFFER (10-39)  COMPACT, COMPLEX 32-BIT FLOATING POINT
;
; THE COSINE TABLE ENTRIES ARE:
;   CT(K)=COS(2*PI*K/CSIZE)
; WHERE CSIZE IS A MULTIPLE OF N
;
;
**'ENTRY TO SPECIAL BINDING MODULE FOR 2-D FFT SETUP
**;
**; ENTER WITH R1 POINTING TO FCB NUMBER
**;            R2 POINTING TO DISPATCH TABLE
**;
***
***************** BEGIN REPEAT FFT CODE INSERTION ***************
***
***
**RPTFT01 MOVRR   R5,R1                   ; COPY FCB BLOCK POINTER
**        EVEN
**        MOVLM   2,FFTSTYP               ; TAG REPEATED FFT CALL
**        MOVMR   R7,2*HS(R5)             ; GET LOG2(FFT SIZE)
**        ANDIR   R7,$F                   ; FORCE TO BE <= 15
**        MOVRM   R7,LOG2SZ               ; SAVE FOR LATER PERMANENT STORAGE
**        MOVIR   R7,SMPSPC               ; POINT TO PARAMETER STORAGE AREA
**        MOVIR   R6,3                    ; SET LOOP COUNTER FOR 4 TRANSFERS
```

```
**
**RPTFT02 POPXI   R5,R4              ; LOAD PASSED PARAMETER INTO R4
**        EVEN
**        ANDIR   R4,SF              ; FORCE ALL TO BE <= 15
**        MOVMR   R3,RPTFT03         ; GET COPY OF SHIFT INSTRUCTION
**        IORRR   R4,R3,SFFF0        ; OR IN SHIFT COUNT
**        MOVRM   R4,RPTFT03         ; STORE SHIFT INSTRUCTION
**        MOVIR   R4,1               ; INIT R4 TO 2**0
**RPTFT03 LLS     R4,0               ; COMPUTE 2**N
**        PUSHXI R7,R4               ; SAVE IN PARAMETER AREA
**        DJP     R6,RPTFT02         ; LOOP OVER ALL 4 PARAMETERS
**        PUSHXI R7,R4               ; NEED 2 COPIES OF FFT SPACING
**        EVEN
**
**;        COMPUTE MAXSMP = (MAXIMUM SAMPLE INDEX) - 1
**;
**;        MAXSMP = (SAMPLE_SPACING)*(FFT_SIZE - 1) +
**;                      (NUMBER_OF_FFT'S - 1)*(FFT_SPACING)
**;               = SA*(SB-1) + (SC-1)*SD
**;
**        MOVMR   R5,FFTSIZ          ; GET SIZE
**        MOVMR   R7,NFFT            ; GET NUMBER OF FFT'S
**        DECR    R5,1               ; CORRECT TO (FFTSIZE-1)
**        DECR    R7,1               ; CORRECT TO (NFFT-1)
**        MOVRM   R7,NFFT            ; SAVE DECREMENTED COUNT FOR LOOPING
**        MULMR   R5,SMPSPC          ; FORM 1ST PRODUCT
**        MULMR   R7,INSPC           ; FORM 2ND PRODUCT
**        ADDRR   R5,R7              ; FORM SUM
**        LRS     R5,1               ; COMMON CORRECTION FOR DOUBLING BY MU
**        MOVRM   R5,MAXSMP          ; SAVE FOR LATER
**        HOP     RPTFT04            ; HOP INTO BINDING CODE
**        EVEN
*
*************** END REPEAT FFT CODE INSERTION ***************
*
```

```
                  (01358) 'ENTRY TO SPECIAL BINDING MODULE FOR VECTOR FFT SETUP
                  (01359) ;
                  (01360) ; DOES ALL BINDING NOT NEEDED EVERY TIME
                  (01361) ; AN FFT IS DONE.
                  (01362) ;
                  (01363) ; ENTER WITH R1 POINTING TO FCB NUMBER
                  (01364) ;            R2 POINTING TO DISPATCH TABLE
                  (01365) ;
                  (01366) ;
         00004276 (01367) FFTSSET = #L
                  (01368) **      MOVZM   FFTSTYP               ; TAG 'MUXED' FFT
04276 F0420002    (01369) RPTFT04 MOVMR R4, 2*HS(R1)          GET U BUFFER ID
04278 9A40FF00    (01370)         ANDIR R4, MSKSLBYT          MASK OUT RIGHT HALF
0427A 3C47        (01371)         LRS R4, 7                   SET FOR FULL WORD INDEX
0427B 0800        (01372)         EVEN                        SKIP TO EVEN BOUNDARY
0427C F0580687    (01373)         MOVMR R5, BCTSAT+HS(R4)     R5= U BUFFER ATTRIBUTES
0427F F050439D    (01374)         MOVRM R5, PWR2$             STORE FOR LATER REFERENCE
                  (01375) ;
                  (01376) ;BIND ALL USIZE-1'S
                  (01377) ;
04280 C0580604    (01378)         MOVMRL R5, BCTSAD(R4)       R5<=USEP, R6<=USIZE-1
                  (01379) *
                  (01380) *************** BEGIN REPEAT FFT CODE INSERTION ***************
                  (01381) *
                  (01382) **      MOVMR   R7,FFTSTYP           ; GET FFT TYPE TAG INDEX
                  (01383) **      JMP     @RPTFT05(R7)         ; JUMP TO NEXT SECTION OF CODE
                  (01384) ;
                  (01385) ** RPTFT05 ADDR   RPTFT07 ( , 1)       ;     'MUXED' FFT
                  (01386) **      ADDR    RPTFT06 ( , 1)       ;     REPEATED FFT
                  (01387) ;
                  (01388) ** RPTFT06 MOVMR  R7,LOG2SZ            ; GET LOG2(FFT SIZE)
                  (01389) **      MOVRM   R7,PWR2$             ; STORE FOR BINDING CODE USAGE
                  (01390) **      CMPMR   R6,MAXSMP            ; CHECK INPUT BUFFER SIZE
                  (01391) **      JMP     ERRSS,LT             ; JUMP IF BUFFER TOO SMALL
                  (01392) **      MOVMR   R7,INSPC             ; GET FFT INPUT VECTOR SPACING
                  (01393) **      MULRR   R7,R5                ; SCALE BY BUFFER SAMPLE SPACING
                  (01394) **      LRS     R7,1                 ; CORRECT FOR FACTOR OF 2 BY MUL
                  (01395) **      MOVRM   R7,INSPC             ; SAVE FOR USE IN POST-SUPPORT MODULE
                  (01396) **      MULMR   R5,SMPSPC            ; COMPUTE INPUT SAMPLE SPACING
                  (01397) **      LRS     R5,1                 ; CORRECT FACTOR OF 2 FROM MUL
                  (01398) **      EVEN
                  (01399) **      MOVMR   R6,FFTSIZ            ; GET CORRECT FFT SIZE
                  (01400) **      MOVRR   R7,R6                ; GET 2ND COPY
                  (01401) **      DECR    R7,1                 ; NEED TO BIND (FFT_SIZE - 1) 6 PLACES
```

```
                   (01402) **      MOVRM   R7,CSMS + WS*CR4A03 + HS
                   (01403) **      MOVRM   R7,CSMS + WS*CSML0S + HS
                   (01404) **      MOVRM   R7,CSMS + WS*CR4A3S + HS
                   (01405) **      MOVRM   R7,CSMS + WS*CR4ARS + HS
                   (01406) **      MOVRM   R7,CSMS + WS*CR4A9S + HS
                   (01407) **      MOVRM   R7,CSMS + WS*CR4A13S + HS
                   (01408) **      HOP     RPTFTOR
                   (01409) **      EVEN
                   (01410) *
                   (01411) *************** END REPEAT FFT CODE INSERTION ***************
                   (01412) *
04282 F06045E7     (01413) RPTFT07 MOVRM R6, CSMS+WS*CR4A03+HS   STORE ALL USIZE-1'S
04284 F0604569     (01414)         MOVRM R6, CSMS+WS*CSML0S+HS   ...
04286 F06045D7     (01415)         MOVRM R6, CSMS+WS*CR4A3S+HS   ...
04288 F0604631     (01416)         MOVRM R6, CSMS+WS*CR4ARS+HS   ...
                   (01417) ;
                   (01418) ;
                   (01419) ;SCALAR A ID IS REALLY THE NUMBER OF MINI-BUFFERS
                   (01420) ;WITHIN THE U BUFFER.
                   (01421) ;FOR EXAMPLE:
                   (01422) ;  IF U BUFFER HAS 1024 COMPLEX POINTS BUT IS
                   (01423) ;  REALLY 4 GROUPS OF 256 POINTS THEN SA ID
                   (01424) ;  SHOULD BE SET TO 4.
                   (01425) ;  IF U BUFFER HAS 1024 POINTS AND IS REALLY
                   (01426) ;  16 GROUPS OF 64 POINTS THEN SA ID SHOULD BE
                   (01427) ;  16.
                   (01428) ;  NORMAL OPERATION WHERE THE U BUFFER CONTAINS
                   (01429) ;  ONE BUFFER TO BE FFT'ED MEANS SA ID SHOULD
                   (01430) ;  BE 1.
                   (01431) ;  SA ID MUST BE A POWER OF 4. (I.E. 1, 4,
                   (01432) ;  16, 64, 256)
                   (01433) ;
0428A F0420001     (01434)         MOVMR R4, HS(R1)              POINT TO SCALAR A ID (SAID)
0428C 9A4000FF     (01435)         ANDIR R4, MSKSRBYT            MASK IT OUT
0428E 407C         (01436)         MOVRR R7, R6                 PUT USIZE-1 IN R7
0428F 2808         (01437) XX1S    SRBC 0, R4                   SKIP SHIFTING NEEDED
04290 2003         (01438)         HOP XX2S
04291 3C71         (01439)         LRS     R7,1                   ; DIVIDE BY 2
04292 3C41         (01440)         LRS R4, 1                    AND SHIFT TILL BIT APPEARS
04293 2105         (01441)         HOP XX1S
                   (01442)         EVEN
04294 F0704649     (01443) XX2S    MOVRM R7, CSMS+WS*CR4A9S+HS   STORE FFTSIZE-1
04296 F070460F     (01444)         MOVRM R7, CSMS+WS*CR4A13S+HS  ...
                   (01445)
```

```
04298 2661     (01446)          INCR R6, 1                      R6<=N(USIZE)
04299 403A     (01447) RPTETON MOVRR R3, R5                     R3<=USEP
0429A 485C     (01448)          MULRR R5, R6                    R5<=2(USEP)(USIZE)
0429B 3C52     (01449)          LRS R5, 2                       R5<=0.5(USEP)(USIZE)
               (01450) ;
               (01451) ;BIND ALL HU'S
               (01452) ;
0429C 9040439D (01453)          MOVIR   R4,HUSTBL-1               ; POINT TO TABLE OF HU BINDING LOC'S
0429E 304E     (01454) HUSLP    POPXI   R4,R7                     ; GET NEXT BINDING ADDR
0429F 0270     (01455)          TEST    R7                        ; CHECK FOR END OF TABLE
042A0 801042AA (01456)          JMP     HUSDN,EQ                  ; ZERO MARKS END OF TABLE
042A2 000F0000 (01457)          CMB     0,0(R7)                   ; RESET MSB OF DELTA FIELD
042A4 F05E0001 (01458)          MOVRM   R5,1(R7)                  ; STORE LOW 16 BITS
042A6 1810     (01459)          SKPL    NE                        ; IF NOT 0, DELTA IS OK
042A7 D20F0000 (01460)          SMB     0,0(R7)                   ; PRODUCT WAS 2**18 BEFORE CORRECTION
042A9 210C     (01461)          BOP     HUSLP                     ; LOOP FOR ALL HU BINDING
               (01462) ;
042AA 0250     (01463) HUSDN    TEST    R5                        ; CHECK PRODUCT
042AB 1810     (01464)          SKPL    NE                        ; IF NOT 0, DELTA IS OK
042AC FC510000 (01465)          MOVAR   R5,$10000                 ; SET UP CORRECT DELTA FOR 2**18
               (01466)
042AE 3C51     (01467)          LRS R5, 1                       R5<=HU/2 (QU)
042AF 0800     (01468)          EVEN                            TO TO EVEN BOUNDARY
               (01469) ;
               (01470) ;BIND ALL QU'S
               (01471) ;
042B0 F0504577 (01472)          MOVRM R5, CSMS+WS*CSML3S+HS   STORE QU'S
042B2 4E56     (01473)          SUBRR R5, R3                    R5<=QU-USEP
042B3 0800     (01474)          EVEN
042B4 F050456F (01475)          MOVRM R5, CSMS+WS*CSML1S+HS   STORE QU-USEP
               (01476) ;
               (01477)          EJECT
```

```
042B6 405C      (01478)          MOVRR R5, R6                   R5<=N
042B7 0800      (01479)          EVEN
042B8 98500003  (01480)          MULIR R5, 3                    R5<=4*(3N/2)
                (01481) ;
                (01482) ;BIND D0-D7'S
                (01483) ;
042BA F0504585  (01484)          MOVRM R5, CSMS+WS*SCRM0+HS     STORE ALL D0'S
042BC F0504589  (01485)          MOVRM R5, CSMS+WS*SCRM2S+HS    ...
042BE F050458D  (01486)          MOVRM R5, CSMS+WS*SCRM4S+HS    ...
042C0 F0504591  (01487)          MOVRM R5, CSMS+WS*SCRM6S+HS    ...
042C2 3C51      (01488)          LRS R5, 1                      R5<=D0/2 (D1)
042C3 0800      (01489)          EVEN
042C4 F0504587  (01490)          MOVRM R5, CSMS+WS*SCRM1S+HS    STORE ALL D1'S
042C6 F050458F  (01491)          MOVRM R5, CSMS+WS*SCRM5S+HS    ...
042C8 3C51      (01492)          LRS R5, 1                      R5<=D1/2 (D2)
042C9 0800      (01493)          EVEN
042CA F050458B  (01494)          MOVRM R5, CSMS+WS*SCRM3S+HS    STORE D2
042CC 3C51      (01495)          LRS R5, 1                      R5<=D2/2 (D3)
042CD 0800      (01496)          EVEN
042CE F0504595  (01497)          MOVRM R5, CSMS+WS*SCRM7S+HS    STORE D3
042D0 3C51      (01498)          LRS R5, 1                      R5<=D3/2 (D4)
042D1 0800      (01499)          EVEN
042D2 F050459B  (01500)          MOVRM R5, CSMS+WS*SCRM8S+HS    STORE D4
042D4 3C51      (01501)          LRS R5, 1                      R5<=D4/2 (D5)
042D5 0800      (01502)          EVEN
042D6 F05045A1  (01503)          MOVRM R5, CSMS+WS*SCRM9S+HS    STORE D5
042D8 3C51      (01504)          LRS R5, 1                      R5<=D5/2 (D6)
042D9 0800      (01505)          EVEN
042DA F05045A7  (01506)          MOVRM R5, CSMS+WS*SCRM10S+HS    STORE D6
042DC 3C51      (01507)          LRS R5, 1                      R5<=D6/2 (D7)
042DD 0800      (01508)          EVEN
042DE F05045AB  (01509)          MOVRM R5, CSMS+WS*SCRM7+HS     STORE D7
                (01510) ;
                (01511)
                (01512)          EJECT
```

ENTRY TO SPECIAL BINDING MODULE FOR VECTOR FFT SETUP

```
042E0 405C      (01513)        MOVRR R5, R6             R5<=N (USIZE)
042E1 3A52      (01514)        LLS R5, 2                R5<=4*N
042E2 2654      (01515)        INCR R5, 4               R5<=4*N+4
042E3 0800      (01516)        EVEN
                (01517) ;
                (01518)        EJECT
```

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

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A091663

```
                  ;
                  ;BIND ALL 4N+4 AND 4N+12'S
                  ;
042E4 F05045F9            MOVRM R5, CSMS+WS*CR4A2S+HS   STORE 4N+4'S
042E6 F050462F            MOVPM R5, CSMS+WS*CR4A3+HS    ...
042E8 2658                INCR R5, 8                    R5<=4*N+12
042E9 0800                EVEN
042EA F05045B5            MOVRM R5, CSMS+WS*CSMUL+HS    STORE 4N+12
042EC F0420001            MOVMR R4, HS(R1)              LOAD Y BUFFER ID
042EF 9A40FF00            ANDIR R4, MSKSLBYT            MASK LEFT HALF
042F0 3C47                LRS R4, 7                     CREATE FULL WORD INDEX
042F1 0800                EVEN
                  ;
                  ;BIND YSEP
                  ;
042F2 C0580604            MOVMRL R5, BCTSAD(R4)         R5<=YSEP, R6<=YSIZE-1
                  *
                  *************** BEGIN REPEAT FFT CODE INSERTION ***************
                  *
                  **      MOVMR   R7,FFTSTYP              ; GET FFT TYPE TAG
                  **      JMP     @RPTFT09(R7)            ; JUMP TO NEXT SECTION OF CODE
                  ;
                  ** RPTFT09 ADDR    RPTFT11( , 1)           ;    'MIXED' FFT
                  **      ADDR    RPTFT10( , 1)           ;    REPEATED FFT
                  ;
                  ** RPTFT10 MOVMR   R7,OUTSPC               ; GET FFT OUTPUT VECTOR SPACING
                  **      MULRR   R7,R5                   ; SCALE BY BUFFER SAMPLE SPACING
                  **      LRS     R7,1                    ; CORRECT FOR FACTOR OF 2 BY MUL
                  **      MOVRM   R7,OUTSPC               ; SAVE FOR USE IN POST-SUPPORT
                  **      CMPMR   R6,MAXSMP               ; CHECK IF OUTPUT VECTOR IS LARGE ENOUGH
                  **      JMP     ERRSS,LT                ; ERROR IF TOO SMALL
                  **      MULMR   R5,SMPSPC               ; COMPUTE OUTPUT SAMPLE SPACING
                  **      LRS     R5,1                    ; CORRECT FOR FACTOR OF 2 BY MUL
                  **      EVEN
                  **      MOVRM   R5,CSMS + WS*CR4A12S + HS      ; STORE YSEP
                  **      MOVMR   R6,FFTSIZ               ; GET SIZE OF OUTPUT VECTOR FOR 1 PASS
                  **      HOP     RPTFT12                 ; CONTINUE BINDING
                  **      EVEN
                  ;
                  **         ERRSIBCR = 29                ; IMPROPER BUFFER ERROR FLAG
                  ** ERRS6   MOVIR   R7,ERRSIBCR           ; SET IMPROPER BUFFER ERROR
                  **      JMP     ERRORS                  ; GO TO EXEC ERROR PROCESSING
                  *
                  *************** END REPEAT FFT CODE INSERTION ***************
```

ENTRY TO SPECIAL BINDING MODULE FOR VECTOR FFT SETUP

```
                   (01563) *
042F4 F05045F1     (01564) RPTFT11 MOVRM R5, CSMS+WS*CR4A12S+HS  STORE YSEP
042F6 2661         (01565)         INCR R6, 1                     R6<=YSIZE
042F7 485C         (01566) RPTFT12 MULRR R5, R6                   R5<=2*YSIZE*YSEP
042F8 0250         (01567)         TEST    R5                      ;SET CONDITON CODES FROM MULTIPLY
042F9 3C51         (01568)         LRS R5, 1                      R5<=YSIZE*YSEP
                   (01569)         EVEN
                   (01570) ;
                   (01571)         EJECT
```

ENTRY TO SPECIAL BINDING MODULE FOR VECTOR FFT SETUP

```
                   (01572) ;
                   (01573) ;BIND YSEP*YSIZE
                   (01574) ;
042FA D00045DF (01575)         CMB     0,CSMS + WS*CR4AOF       ; RESET MSB OF DELTA FILED
042FC 1B30     (01576)         SKPL    GE                       ; LEAVE MSB CLEAR WHEN PRODUCT POS
042FD D20045DF (01577)         SMB     0,CSMS + WS*CR4AOF       ; MSB SHOULD BE SET
042FF 81104306 (01578)         JMP     YSPSZ,NE                 ; IF NOT 0, ALL IS WELL
04301 CC0045DF (01579)         MOVZM   CSMS + WS*CR4AOF + HS    ; PRODUCT IS 2**18 -- SET DELTA = 0
04303 9050B000 (01580)         MOVIR   R5,$8000                 ; YSEP*YSIZE/4 = 2**16
04305 2004     (01581)         HOP     YSPSZ4                   ; GO CONTINUE BINDING
04306 F05045DF (01582) YSPSZ   MOVRM R5, CSMS+WS*CR4AOF+HS   STORE YSEP*YSIZE
04308 3C52     (01583)         LRS R5, 2                     R5<=YSIZE*YSEP/4
04309 0800     (01584)         EVEN
                   (01585) ;
                   (01586) ;BIND YSEP*YSIZE/4
                   (01587) ;
0430A F05045DD (01588) YSPSZ4  MOVRM R5, CSMS+WS*CR4A11S+HS  STORE YSEP*YSIZE/4
0430C F0420003 (01589)         MOVMR R4, 3*HS(R1)            LOAD C BUFFER ID
0430E 9A40FF00 (01590)         ANDIR R4, MSKSLBYT
04310 3C47     (01591)         LRS R4, 7                     CREATE FULL WORD INDEX
04311 0800     (01592)         EVEN
                   (01593) ;
                   (01594)         EJECT
```

ENTRY TO SPECIAL BINDING MODULE FOR VECTOR FFT SETUP

```
                (01595) ;
                (01596) ;BIND CBASE
                (01597) ;
04312 C0680582  (01598)        MOVMRL R6, BCTSBA(R4)          LOAD C BASE ADDRESS
04314 9050461E  (01599)        MOVIR R5, CSMS+WS*CR4A4S       POINT TO LOAD CBASE INST.
04316 9A60000F  (01600)        ANDIR R6, $F                   AND OUT LOW FOUR BITS
04318 766AFFF0  (01601)        IORWK R6, R5, $FFF0            OR IN NEW FOUR BITS
0431A 846A0000  (01602)        MOVRML R6, 0(R5)               AND STORE BACK IN INST.
0431C C0580604  (01603)        MOVMRL R5, BCTSAD(R4)          R5<=CSEP, R6<=CSIZE-1
0431E 2661      (01604)        INCR R6, 1                     R6<=CSIZE
0431F 485C      (01605)        MULRR R5, R6                   R5<=2*(CSEP)(CSIZE)
04320 3C53      (01606)        LRS R5, 3                      R5<=0.25*(CSEP)(CSIZE) (HPI)
04321 0800      (01607)        EVEN
                (01608) ;
                (01609) ;BIND ALL HPI'S
                (01610) ;
04322 F0504625  (01611)        MOVRM R5, CSMS+WS*CR4A5S+HS    STORE ALL HPI'S
04324 E0504629  (01612)        MOVRM R5, CSMS+WS*CR4A6S+HS    ...
04326 E050462D  (01613)        MOVRM R5, CSMS+WS*CR4A7S+HS    ...
                (01614) ;
                (01615) ;S1ANG=HPI/SSI, RIGHT NOW ONLY RADIX 2 AND RADIX 4
                (01616) ;HAVE BEEN IMPLEMENTED.  SO ALL THAT IS NECESSARY
                (01617) ;TO CALCULATE SSI IS TO KNOW IF USIZE IS AN EVEN OR
                (01618) ;ODD POWER OF TWO.  THIS IS DONE BY CHECKING THE
                (01619) ;POWER OF TWO ENTRY FOR THE U BUFFER IN THE BCTSAT
                (01620) ;TABLE.  IF BIT 0 IS ON, THEN IT'S AN ODD POWER.
                (01621) ;
04328 F030024D  (01622)        MOVMR R3, APSBSL               FETCH POINTER
0432A D800439D  (01623)        SMBC 0, PWR2S                  SKIP IF EVEN POWER OF TWO
0432C 2006      (01624)        HOP SBMS1                      ... ODD POWER
0432D F80845C7  (01625)        MOVLM 4, CSMS+WS*CR4AD1+HS     SET AND BIND SSI = 4
0432F F80A439C  (01626)        MOVLM FLGSG1, GSFLGS+HS         RESET G1
04331 3C52      (01627)        LRS R5, 2                      S1ANG=HPI/4
04332 2005      (01628)        HOP SBMS2
04333 F80445C7  (01629) SBMS1  MOVLM 2, CSMS+WS*CR4AD1+HS     SET AND BIND SSI = 2
04335 F84A439C  (01630)        MOVLM FLGSG1+FLGSSET, GSFLGS+HS     SET G1
04337 3C51      (01631)        LRS R5, 1                      S1ANG=HPI/2
                (01632)        EVEN
                (01633) SBMS2
                (01634) ;
                (01635) ;BIND S1ANG TO S7ANG'S
                (01636) ;
04338 F0504657  (01637)        MOVRM R5, CSMS+WS*ANGL1S+HS    STORE S1ANG
0433A 3C52      (01638)        LRS R5, 2
```

ENTRY TO SPECIAL BINDING MODULE FOR VECTOR FFT SETUP

```
04338 0800      (01639)        EVEN
0433C F0504659 (01640)        MOVRM R5, CSMS+WS*ANGL2S+HS   STORE S2ANG
0433E 3C52      (01641)        LRS R5, 2
0433F 0800      (01642)        EVEN
04340 F050465B (01643)        MOVRM R5, CSMS+WS*ANGL3S+HS   STORE S3ANG
04342 3C52      (01644)        LRS R5, 2
04343 0800      (01645)        EVEN
04344 F050465D (01646)        MOVRM R5, CSMS+WS*ANGL4S+HS   STORE S4ANG
04346 3C52      (01647)        LRS R5, 2
04347 0800      (01648)        EVEN
04348 F050465F (01649)        MOVRM R5, CSMS+WS*ANGL5S+HS   STORE S5ANG
0434A 3C52      (01650)        LRS R5, 2
0434B 0800      (01651)        EVEN
0434C F0504661 (01652)        MOVRM R5, CSMS+WS*ANGL6S+HS   STORE S6ANG
0434E 3C52      (01653)        LRS R5, 2
0434F 0800      (01654)        EVEN
04350 F0504663 (01655)        MOVRM R5, CSMS+WS*ANGL7S+HS   STORE S7ANG
```

```
                  (01656) *          SPECIAL BINDING FOR WBASE, YBASE, AND UBASE
                  (01657) ;
                  (01658) ; THIS SECTION DOES THE FAST BINDING FOR
                  (01659) ; CHANGES IN WBASE, YBASE, AND UBASE ONLY.
                  (01660) ;
                  (01661) SBMSFFT EVEN                             START ON EVEN BOUNDARY
04352 F0420004 (01662)         MOVMR R4, 4*HS(R1)               GET W BUFFER ID
04354 9A40FF00 (01663)         ANDIR R4, MSKSLBYT               MASK THE LEFT HALF
04356 3C47     (01664)         LRS R4, 7                        CREATE FULL WORD INDEX
04357 0800     (01665)         EVEN
                  (01666) ;
                  (01667) ;BIND ALL WBASE'S
                  (01668) ;
0435B C06B05B2 (01669)         MOVMRL R6, BCTSBA(R4)            LOAD BASE ADDRESS IN R6, R7
0435A 905045B0 (01670)         MOVIR R5, CSMS+WS*CSM01S         POINT TO LOAD INSTRUCTION
0435C 9A60000F (01671)         ANDIR R6, $F                     ONLY LOW FOUR BITS
0435E 766AFFF0 (01672)         IORWK R6, R5, $FFF0              'OR'ED INTO LOAD INST.
04360 846A0000 (01673)         MOVRML R6, 0(R5)                 STORE ALL WBASE'S
04362 9A60000F (01674)         ANDIR R6, $F                     MASK OUT OLD LOAD INST.
04364 905045CC (01675)         MOVIR R5, CSMS+WS*CR4A1S         POINT TO NEXT LOAD WBASE
04366 766AFFF0 (01676)         IORWK R6, R5, $FFF0              OR WBASE INTO IT
04368 846A0000 (01677)         MOVRML R6, 0(R5)                 STORE WBASE
                  (01678) ;
                  (01679) ;BIND UBASE
                  (01680) ;
0436A F0420002 (01681)         MOVMR R4, 2*HS(R1)               LOAD U BUFFER ID
0436C 9A40FF00 (01682)         ANDIR R4, MSKSLBYT               MASK THE LEFT HALF
0436E 3C47     (01683)         LRS R4, 7                        CREATE FULL WORD INDEX
0436F 0800     (01684)         EVEN
04370 C06B05B2 (01685)         MOVMRL R6, BCTSBA(R4)            LOAD UBASE ADDRESS IN R6, R7
04372 90504566 (01686)         MOVIR R5, CSMS+WS*CSML6S         POINT TO LOAD UBASE INST.
04374 9A60000F (01687)         ANDIR R6, $F                     ONLY LOW ORDER FOUR BITS
04376 766AFFF0 (01688)         IORWK R6, R5, $FFF0              'OR' INTO INST.
04378 846A0000 (01689)         MOVRML R6, 0(R5)                 STORE UBASE
                  (01690) *
                  (01691) *************** BEGIN REPEAT FFT CODE INSERTION ***************
                  (01692) *
                  (01693) **        ADDMR    R7,INSPC             ; BUMP TO NEXT INPUT VECTOR
                  (01694) **        ADC      R6                   ; COMPLETE THE BUMP
                  (01695) **        EVEN
                  (01696) **        MOVRML   R6,LDSUBS            ; SAVE NEXT <LOAD UBASE> INSTRUCTION
                  (01697) *
                  (01698) *************** END REPEAT FFT CODE INSERTION ***************
                  (01699) *
```

SPECIAL BINDING FOR WBASE, YBASE, AND UBASE

```
                    ;
                    ;BIND YBASE
                    ;
0437A F0420001              MOVMR R4, HS(R1)            LOAD Y BUFFER ID
0437C 9A40FF00              ANDIR R4, MSK$LBYT          MASK LEFT HALF
0437E 3C47                  LRS R4, 7                   CREATE FULL WORD INDEX
0437F 0800                  EVEN
04380 C06805B2              MOVMRL R6, BCT$BA(R4)       LOAD YBASE ADDRESS IN R6, R7
04382 9050450A              MOVIR R5, CSMS+WS*CR4A10S   POINT TO LOAD INST.
04384 9A60000F              ANDIR R6, $F                MASK LOW FOUR BITS
04386 766AFFF0              IORWK R6, R5, $FFF0         OR INTO INST.
04388 846A0000              MOVRML,R6, 0(R5)            STORE YBASE
                    *
                    *************** BEGIN REPEAT FFT CODE INSERTION ***************
                    *
                    **        ADDMR   R7,OUTSPC             ; BUMP TO NEXT OUTPUT VECTOR
                    **        ADC     R6                    ; COMPLETE THE BUMP
                    **        EVEN
                    **        MOVRML  R6,LD$YBS             ; SAVE NEXT <LOAD YBASE> INSTRUCTION
                    *
                    *************** END REPEAT FFT CODE INSERTION ***************
                    *
```

```
                   (01722) '         SET PENDING SLOTS TO PROPER VALUES
                   (01723) ;
04388 C6340BE8 (01724)            PUSHMIL R3, AFDTSORG(R2)        STORE APU MODULE BUS ORIGIN
                   (01725)
0438C 9071FFFF (01726)            MOVIR R7, -WS
0438F C6H7FFFF (01727)            PUSHMIL R3, @-WS(R3)            STORE APU MODULE START AND SIZE
04390 C6340BEA (01728)            PUSHMIL R3, AFDTSORG+WS(R2)     STORE APS MODULE BUS ORIGIN
                   (01729) *
                   (01730) *************** BEGIN REPEAT FFT CODE INSERTION ***************
                   (01731) *
                   (01732) **       MOVMR    R4,FFTSTYP                 ; GET FFT TYPE TAG
                   (01733) **     . XCT      RPTFT20(R4)                ; PUSH CSPU POST-SUPPORT MODULE ADDR
                   (01734) **         PUSHMIL R3, AFDTSORG+2*WS(R2)
                   (01735) *
                   (01736) *************** END REPEAT FFT CODE INSERTION ***************
                   (01737) *
04392 2632     (01738)            INCR   R3, 2
04393 2771     (01739)            DECR R7, 1
                   (01740)            EVEN
04394 C4H7FFFC (01741)            PUSHMI R3, @-2*WS(R3)           STORE APS MODULE SIZE
                   (01742) **       MOVIR R4, -3*HS(R3)             GET SPECIAL SUPPORT SEMAPHORE
                   (01743) **       MOVWK R4, R4, MSK$LBYT
                   (01744) **       LRS R4, 8
                   (01745) **       PUSHXI R3, R4                   STORE SPECIAL SUPPORT SEMAPHORE
                   (01746) **       MOVRR R5, R1
                   (01747) **       INCR R5, HS                     POINT TO SCALAR A ID
                   (01748) **       MOVWK R4, R5, MSK$RBYT
                   (01749) **       PUSHXIL R3, R4                  STORE SCALAR A IDENTIFIER
04396 2634     (01750)             INCR   R3, 4
04397 C430439C (01751)            PUSHMI  R3, G$FLGS+HS           STORE FLAG G1
                   (01752) **       INCR R3, 4
                   (01753) **       PUSHMI R3, ZERO                 SET FOR NO PBF
                   (01754) *
                   (01755) *
04399 80000F63 (01756)            JMP    APSHNDRO                 AND EXIT
                   (01757) **'DATA STORAGE FOR SPECIAL FFT BINDING
                   (01758) ***
                   (01759) ***************** BEGIN REPEAT FFT CODE INSERTION ***************
                   (01760) ***
                   (01761) **;
                   (01762) **;       EXECUTION LIST FOR POST-SUPPORT ADDR QUEUEING
                   (01763) **;
                   (01764) **        EVEN
                   (01765) **RPTFT20 PUSHMIL R3,AFDTSORG+2*WS(R2)    ; CSPU PRE-SUPPORT ADDR FOR 'MUXED' FF
```

```
                  **         PUSHMIL R3,RPTFT21            ; POST-SUPPORT ADDR FOR REPEAT FFT
                  **;
                  **RPTFT21 ADDR    RPTFT31( ,1,$F)        ; POST-SUPPORT ENTRY ADDR
                  **;
                  **;
                  **FFTSTYP DATA    MSS                    ; FFT TYPE TAG
                  **LOG2SZ  DATA    MSS                    ; TEMPORARY STORAGE OF LOG2(FFT_SIZE)
                  **MAXSMP  DATA    MSS                    ; MAXIMUM SAMPLE INDEX - 1
                  **;
                  **        EVEN                           ; MAKE THIS BLOCK EVEN FOR LATER TRANS
                  **SMPSPC  DATA    MSS                    ; INPUT SAMPLE SPACING
                  **FFTSIZ  DATA    MSS                    ; SINGLE FFT SIZE
                  **NFFT    DATA    MSS                    ; NUMBER OF FFT'S TO DO
                  **INSPC   DATA    MSS                    ; INPUT FFT VECTOR SPACING
                  **OUTSPC  DATA    MSS                    ; OUTPUT FFT VECTOR SPACING
                  **;
                  **        DATA    MSS                    ; NEED FULL WORD BOUNDARY
                  **;
                  **LDSUBS  DATA    F'0,0'                 ; BOUND <LOAD UBASE> INSTR
                  **LDSYBS  DATA    F'0,0'                 ; BOUND <LOAD YBASE> INSTR
                  *
                  *************** END REPEAT FFT CODE INSERTION ***************
                  *
0439B 0004        GSFLGS  DATA    $4, $25                  ; CODES FOR CONTROLLING FLAGS G0 & G1
0439C 0025
0439D 0000        PWR2S   DATA MSS                         STORAGE FOR POWER OF TWO
                  ;
0439E 456C        BUSTBL  DATA    CSMS+WS*CSML             ; TABLE OF ADDRS FOR BINDING HU
0439F 4570                DATA    CSMS+WS*CSME
043A0 4574                DATA    CSMS+WS*CSML2$
043A1 4578                DATA    CSMS+WS*CSML4$
043A2 457E                DATA    CSMS+WS*CSML5$
043A3 0000                DATA    0
                  **'        REPEAT FFT POST-SUPPORT MODULE
                  **;
                  **         EVEN
                  **RPTFT31 MOVIR   R7,NFFT-2              ; POINT TO NEEDED STEPPING INFO
                  **        MOVIR   R6,3                   ; FOUR FULL WORDS TO TRANSFER
                  **        BMOVEL  R7, R6, RPTSPRM        ; COPY THE BLOCK FOR UPDATING APS CODE
                  **        MOVZM   APSASSS                ; ALLOW BINDING TO CONTINUE
                  **        HOP     RPTFT33                ; JUMP TO BINDING UPDATE
                  **;
                  **RPTFT30 RET                            ; RETURN FROM INTERRUPT
                  **        EVEN                           ; GET TO FULL WORD BOUNDARY
```

SET PENDING SLOTS TO PROPER VALUES

```
(01809) **RPTFT33 MOVIR   R7,RPTSUBS-2             ; POINT BEFORE <LOAD UBASE> INSTRUCTIO
(01810) **        MOVIR   R6,1                     ; 2 FULL WORDS TO TRANSFER TO APS
(01811) **        LPROCL  R7,R6,APSR               ; WRITE TO APS
(01812) **        MOVLM   FLG$SET+FLG$RI,SYS$FLGS  ; SET RI -- TURN ON AP
(01813) **        DECM    RPTSCNT                  ; COUNT THIS FFT
(01814) **        SKP     LE                       ; SKIP THE HOP IF DONE
(01815) **        HOP     RPTFT32                  ; GO COMPUTE NEXT SET OF BASE ADDR'S
(01816) **;
(01817) **        RET                              ; RELEASE THE CSPU
(01818) **        EVEN                             ; GET TO FULL WORD BOUNDARY
(01819) **        JMP     APSDONE                  ; ALL DONE -- LET EXEC CONTINUE
(01820) **;
(01821) **RPTFT32 MOVMRL  R4,RPTSYBS               ; GET <LOAD YBASE> INSTRUCTION
(01822) **        MOVMRL  R6,RPTSUBS               ; GET <LOAD UBASE> INSTRUCTION
(01823) **        ADDMR   R5,RPTSOSP               ; ADD SPACING TO NEXT VECTOR BASE
(01824) **        ADC     R4                       ; COMPLETE THE COMPUTATION
(01825) **        ADDMR   R7,RPTSISP               ; ADD SPACING TO NEXT VECTOR BASE
(01826) **        ADC     R6                       ; COMPLETE THE COMPUTATION
(01827) **        MOVRML  R4,RPTSYBS               ; STORE THE INSTRUCTION BACK
(01828) **        MOVRML  R6,RPTSUBS               ; STORE THE INSTRUCTION BACK
(01829) **        HOP     RPTFT30                  ; GO BACK TO LOOP START FOR RET
(01830) **;
(01831) **        EVEN
(01832) **;
(01833) **RPTSPRM                                  ; DATA TABLE FOR UPDATING APS CODE
(01834) **RPTSCNT DATA    M$S                      ; CURRENT COUNT FOR FFT
(01835) **RPTSISP DATA    M$S                      ; CURRENT SPACING TO NEXT INPUT VECTOR
(01836) **RPTSOSP DATA    M$S                      ; CURRENT SPACING TO NEXT OUTPUT VECTO
(01837) **        DATA    M$S                      ; POSITION HOLDER
(01838) **RPTSUBS DATA    F'0,0'                   ; CURRENT INPUT VECTOR BASE ADDR
(01839) **RPTSYBS DATA    F'0,0'                   ; CURRENT OUTPUT VECTOR BASE ADDR
```

```
                    (01840) 'FFT - AP PROGRAMS
                    (01841)         OPADD FWI, (3 .LS. 10)+(12 .LS. 5)+X'16'
                    (01842) !   APU PROGRAMS
                    (01843) ;
                    (01844) ;BINDING SECTION FOR EXEC
                    (01845) ;
                    (01846)         EVEN
      043A4 0000    (01847)         DATA CSM2SSA
      043A5 006D    (01848)         DATA CR4SSZ
                    (01849)         EVEN
                    (01850) ;
                    (01851) ;
                    (01852) !          SCRAMBLE AND FIRST RADIX-2 STAGE, FORWARD
                    (01853) ; 03/08/78
                    (01854) ; SCRAMBLE AND FIRST STAGE OF FFT,G1 SET
                    (01855) ;
                    (01856) ; FUNCTION
                    (01857) ; LETTING EIGHT SUCESSIVE INPUTS BEING DESIGNATED BY
                    (01858) ; RU0,RU1,IU1,IU0,IU2,IU3,RU3,RU2
                    (01859) ; THE EIGHT OUTPUTS ARE PROVIDED
                    (01860) ; RU0+RU1,RU0-RU1,IU0+IU1,IU0-IU1
                    (01861) ;  IU2+IU3,IU2-IU3,RU2+RU3,RU2-RU3
                    (01862) ; FOR RELATIONSHIP OF INPUTS TO U(K), AND OUTPUTS TO Y(K),
                    (01863) ; SEE SUPPORTING APS PROGRAM, CSM
                    (01864) ;
                    (01865) CSM2S   BEGIN APU(CSM2)
           00000000 (01866)         #A=00
                    (01867) ;
A00 043A6 9005000D (01868) CSM2SSA JUMPC(CSM4F, G1)
A01 043A8 10000003 (01869)         JUMP(CSM2E)
                    (01870) ;
A02 043AA 089C089C (01871) CSM2L   MOV(R,00)                                   00=IY0\IY1
                    (01872) ;
A03 043AC 08F008F0 (01873) CSM2F   MOV(IQA,A0)                                 A0=RU0
A04 043AE 08F108F1 (01874)         MOV(IQA,A1)                                 A1=RU1
A05 043B0 41004900 (01875)         ADD(A0,A1)\SUB(A0,A1)
                    (01876) ;
A06 043B2 08F308F3 (01877)         MOV(IQA,A3)                                 A3=IU1
A07 043B4 08F208F2 (01878)         MOV(IQA,A2)                                 A2=IU0
A08 043B6 435C485C (01879)         MOV(00),ADD(A2,A3)\MOV(00),SUB(A2,A3)       00=RY0\RY1
                    (01880) ;
A09 043B8 90160002 (01881)         JUMPC(CSM2L,FWI)
                    (01882) ;
A0A 043BA 089C089C (01883)         MOV(R,00)                                   00=IY0\IY1
```

```
                  (01884) ;
  A0B 043BC 00000000 (01885)        NOP
  A0C 043BE 1000002B (01886)        JUMP(CR4FS)
                  (01887) ;
```

```
                        (01888) '          SCRAMBLE AND FIRST RADIX-4 STAGE, FORWARD
                        (01889) ; SCRAMBLE AND FORWARD RADIX 4 STAGE OF FFT,G1 CLEAR
                        (01890) ;
                        (01891) ; FUNCTION
                        (01892) ; THE EIGHT SUCESSIVE INPUTS ARE PROVIDED TO LOOP
                        (01893) ; RU0,RU1,IU1,IU0,IU2,IU3,RU3,RU2
                        (01894) ; THE INTERMEDIATE RADIX TWO RESULTS ARE CALCULATED
                        (01895) ; S0=U0+U1,S1=U0-U1,S2=U2+U3,S3=U2-U3
                        (01896) ; THE OUTPUTS THEN BEING GIVEN BY
                        (01897) ; Y0=S0+S2,Y1=S1-JS3,Y2=S0-S2,Y3=S1+JS3
                        (01898) ; THE ACTUAL OUTPUT SEQUENCE BEING
                        (01899) ; RY0,RY1,IY0,IY1,IY2,IY3,RY2,RY3
                        (01900) ;
                        (01901) ; APU INITIALIZATION
                        (01902) ;
                        (01903) ;
A0D 043C0 08F008F0 (01904) CSM4F    MOV(IOA,A0)                                A0=RU0\RU0
A0E 043C2 08F108F1 (01905)          MOV(IOA,A1)                                A1=RU1\RU1
A0F 043C4 08F308F3 (01906)          MOV(IOA,A3)                                A3=IU1\IU1
A10 043C6 41004900 (01907)          ADD(A0,A1)\SUB(A0,A1)
A11 043C8 08F208F2 (01908)          MOV(IOA,A2)                                A2=IU0\IU0
A12 043CA 1000001B (01909)          JUMP(CSM4FS)
                        (01910) ;
                        (01911) ;
                        (01912) ; CSM4F, APU INNER LOOP
                        (01913)
A13 043CC 46BC4FBC (01914) #1       MOV(OQ),ADD(A5,A6)\MOV(OQ),SUB(A5,A7)      OQ=RY0\RY1
A14 043CE 08F008F0 (01915)          MOV(IOA,A0)                                A0=RU0
                        (01916)
A15 043D0 4FBC47BC (01917)          MOV(OQ),SUB(A5,A6)\MOV(OQ),ADD(A5,A7)      OQ=IY0\IY1
A16 043D2 08F108F1 (01918)          MOV(IOA,A1)                                A1=RU1
                        (01919)
A17 043D4 4F9C4F9C (01920)          MOV(OQ),SUB(A4,A7)\MOV(OQ),SUB(A4,A6)      OQ=IY2\IY3
A18 043D6 08F308F3 (01921)          MOV(IOA,A3)                                A3=IU1
                        (01922)
A19 043D8 411C491C (01923)          MOV(OQ),ADD(A0,A1)\MOV(OQ),SUB(A0,A1)      OQ=RY2\RY3
A1A 043DA 08F208F2 (01924)          MOV(IOA,A2)                                A2=IU0
                        (01925)
A1B 043DC 43544B54 (01926) CSM4FS   MOV(A4),ADD(A2,A3)\MOV(A4),SUB(A2,A3)      A4=RS0\RS1
A1C 043DE 08F008F0 (01927)          MOV(IOA,A0)                                A0=IU2
A1D 043E0 08F108F1 (01928)          MOV(IOA,A1)                                A1=IU3
                        (01929)
A1E 043E2 41154915 (01930)          MOV(A5),ADD(A0,A1)\MOV(A5),SUB(A0,A1)      A5=IS0\IS1
A1F 043E4 08F308F3 (01931)          MOV(IOA,A3)                                A3=RU3
```

```
A20 043E6 08F208F2 (01932)        MOV(IQA,A2)                               A2=RU2
                   (01933)
A21 043E8 43564B56 (01934)        MOV(A6),ADD(A2,A3)\MOV(A6),SUB(A2,A3)     A6=IS2\IS3
                   (01935)
A22 043EA 47974697 (01936)        MOV(A7),ADD(A4,A7)\MOV(A7),ADD(A4,A6)     A7=RS2\RS3
                   (01937)
A23 043EC 90160013 (01938)        JUMPC(#1,FWI)
                   (01939)
A24 043EE 46BC4FBC (01940)        MOV(OQ),ADD(A5,A6)\MOV(OQ),SUB(A5,A7)     OQ=RY0\RY1
A25 043F0 4FBC47BC (01941)        MOV(OQ),SUB(A5,A6)\MOV(OQ),ADD(A5,A7)     OQ=IY0\IY1
A26 043F2 4F9C4F9C (01942)        MOV(OQ),SUB(A4,A7)\MOV(OQ),SUB(A4,A6)     OQ=IY2\IY3
A27 043F4 089C089C (01943)        MOV(R,OQ)                                 OQ=RY2\RY3
```

```
'          SUCCESSIVE RADIX-4 STAGES, FORWARD
;
;USES APS PROGRAM CR4A
;
;MATHEMATICS
;
; W=A+BE+CE2+DE3=P+Q
; X=A-JBE-CE2+JDE3=R-S
; Y=A-BE+CE2-DE3=P-Q
; Z=A+JBE-CE2-JDE3=R+S

; P=A+CE2,R=A-CE2
; Q=E(B+DE2),S=JE(B-DE2)

; PR=AR+CRCOS2X+CISIN2X
; PI=AI+CICOS2X-CRSIN2X
; RR=AR-CRCOS2X-CISIN2X
; RI=AI-CICOS2X+CRSIN2X
; QR=BRCOSX+BISINX+DRCOS3X+DISIN3X
; QI=BICOSX-BRSINX+DICOS3X-DRSIN3X
; SR=BRSINX-BICOSX+DICOS3X-DRSIN3X
; SI=BRCOSX+BISINX-DRCOS3X-DISIN3X
;
; SINX STORED IN M1\M5
; SIN2X STORED IN M6\M2
; SIN3X STORED IN M7\M3
; COSX STORED IN M5\M1
; COS2X STORED IN M2\M6
; COS3X STORED IN M3\M7

        EJECT
```

```
                       (01975) ;CR4F-PIPELINE STARTUP
                       (01976)
                       (01977)
A28 043F6 202A202A (01978) CR4FS    CLEAR(AF2)
A29 043F8 20292029 (01979) CR4FSA   CLEAR(AF1)
A2A 043FA 20282028 (01980)          CLEAR(AF0)
                   (01981)
A2B 043FC 16801680 (01982)          K(1)
A2C 043FE 080908F0 (01983)          MOV(ZERO,M1)\MOV(IOA,A0)                  A0=DI\DR
A2D 04400 08F0080D (01984)          MOV(IOA,A0)\MOV(ZERO,M5)                  SINX=0=M1\M5
                   (01985)
                   (01986)
A2E 04402 088D0889 (01987)          MOV(R,M5)\MOV(R,M1)                       COSX=1=M5\M1
A2F 04404 088A088F (01988)          MOV(R,M2)\MOV(R,M6)                       COS2X=1=M2\M6
A30 04406 088B088F (01989)          MOV(R,M3)\MOV(R,M7)                       COS3X=1=M3\M7
                   (01990)
A31 04408 08F1080A (01991)          MOV(IOA,A1)\MOV(ZERO,M2)                  A1=BI\BR
A32 0440A 080E08F1 (01992)          MOV(ZERO,M6)\MOV(IOA,A1)                  SIN2X=0=M6\M2
A33 0440C 080F0808 (01993)          MOV(ZERO,M7)\MOV(ZERO,M3)                 SIN3X=0=M7\M3
                   (01994)
A34 0440E 08F808F8 (01995)          MOV(IOA,M0)                               M0=CR
A35 04410 84408440 (01996)          MUL(M0,M6)                                P=CRSIN2X\CRCOS2X
A36 04412 0A200220 (01997)          NEG(A1)\R(A1)                             R=-BI\BR
                   (01998)
A37 04414 10000053 (01999)          JUMP(CR4FF)
                   (02000)
                   (02001) ;CR4F;COSINE ENTRY
                   (02002) ;
A38 04416 08ED08E9 (02003) CR4FC    MOV(IOA,M5)\MOV(IOA,M1)                   COSX TO M5\M1
A39 04418 08F908FD (02004)          MOV(IOA,M1)\MOV(IOA,M5)                   SINX TO M1\M5
A3A 0441A 08A008A0 (02005)          MOV(P,NULL)
A3B 0441C 08EF08EA (02006)          MOV(IOA,M6)\MOV(IOA,M2)                   SIN2X TO M6\M2
A3C 0441E 08EA08EF (02007)          MOV(IOA,M2)\MOV(IOA,M6)                   COS2X TO M2\M6
A3D 04420 08EB08EF (02008)          MOV(IOA,M3)\MOV(IOA,M7)                   COS3X TO M3\M7
A3E 04422 08EF08EB (02009)          MOV(IOA,M7)\MOV(IOA,M3)                   SIN3X TO M7\M3
                   (02010) ;
                   (02011) ;CR4F-BUTTERFLY
                   (02012)
A3F 04424 08F808E8 (02013) CR4FB    MOV(IOA,M0)                               DR TO M0
A40 04426 A4748474 (02014)          MOV(A4),MULN(M0,M7)\MOV(A4),MUL(M0,M7)    A4=CICOS2X\CISIN2X
A41 04428 4A954455 (02015)          MOV(A5),SUB(A4,A2)\MOV(A5),ADD(A2,A4)     A5=QI\QR
A42 0442A 08EC08EC (02016)          MOV(IOA,M4)                               DI TO M4
A43 0442C 4A724A72 (02017)          MOV(A2),SUB(A3,A2)                        A2=CICOS2X-CRSIN2X
                   (02018) ;                                                     \CISIN2X+CRCOS2X
```

```
                         (02019)
                         (02020)
A44 0442E 8590A590 (02021)          MOV(A0),MUL(M3,M4)\MOV(A0),MULN(M3,M4)    A0=DRSIN3X\DRCOS3X
A45 04430 4278427B (02022)          MOV(EX0),ADD(A3,A2)                       EX=RI\RR
A46 04432 08560856 (02023)          MOV(EXI,A6)                               A6=RR\RI
A47 04434 08F808FR (02024)          MOV(IOA,M0)                               RI TO M0
A48 04436 47D447D4 (02025)          MOV(A4),ADD(A6,A7)                        A4=PI\PR
                         (02026)
                         (02027)
A49 04438 8431A431 (02028)          MOV(A1),MUL(M0,M5)\MOV(A1),MULN(M0,M5)    A1=DICOS3X\DISIN3X
A4A 0443A 4B3C403C (02029)          MOV(OO),SUB(A1,A0)\MOV(OO),ADD(A1,A0)     OO=ZR\ZI
A4B 0443C 08ECO8EC (02030)          MOV(IOA,M4)                               RR TO M4
A4C 0443E 4D904D90 (02031)          MOV(A0),SUB(A4,A5)                        A0=DICOS3X-DRSIN3X
                         (02032) ;                                               \DISIN3X+DRCOS3X
                         (02033)
                         (02034)
                         (02035)
A4D 04440 A4918491 (02036)          MOV(A1),MULN(M1,M4)\MOV(A1),MUL(M1,M4)    A1=BICOSX\BISINX
A4E 04442 4FDC4FDC (02037)          MOV(OO),SUB(A6,A7)                        OO=YI\YR
A4F 04444 08F808F8 (02038)          MOV(IOA,M0)                               CR TO M0
A50 04446 459C459C (02039)          MOV(OO),ADD(A4,A5)                        OO=XR\XI
                         (02040)
                         (02041)
A51 04448 A4528452 (02042)          MOV(A2),MULN(M0,M6)\MOV(A2),MUL(M0,M6)    A2=BRSINX\BRCOSX
A52 0444A 495C423C (02043)          MOV(OO),SUB(A2,A1)\MOV(OO),ADD(A1,A2)     OO=WR\WI
A53 0444C 08ECO8EC (02044) CR4FF    MOV(IOA,M4)                               CI TO M4
A54 0444E 41114831 (02045)          MOV(A1),ADD(A0,A1)\MOV(A1),SUB(A1,A0)     A1=BRSINX-BICOSX
                         (02046) ;                                               \BRCOSX+BISINX
                         (02047)
                         (02048)
A55 04450 8512A512 (02049)          MOV(A2),MUL(M2,M4)\MOV(A2),MULN(M2,M4)    A2=CRSIN2X\CRCOS2X
A56 04452 08F34037 (02050)          MOV(IOA,A3)\MOV(A7),ADD(A1,A0)            A3=AI \ A7=SI
A57 04454 491708F3 (02051)          MOV(A7),SUB(A0,A1)\MOV(IOA,A3)            A7=SR \ A3=AR
A58 04456 9028003F (02052)          JUMPC(CR4FB,AF0),CLEAR                    AF1;STAGE DONE
A59 04458 90290038 (02053)          JUMPC(CR4FC,AF1),CLEAR                    AF0;COSINES USED
                         (02054)
                         (02055)
                         (02056) ; CR4F-PIPELINE CLEANUP
A5A 0445A 08B408B4 (02057)          MOV(P,A4)                                 A4=CICOS2X\CISIN2X
                         (02058)
                         (02059)
A5B 0445C 4A954455 (02060)          MOV(A5),SUB(A4,A2)\MOV(A5),ADD(A2,A4)     A5=QI\QR
A5C 0445E 4A724A72 (02061)          MOV(A2),SUB(A3,A2)                        A2=CICOS2X-CRSIN2X
                         (02062) ;                                               \CISIN2X+CRCOS2X
```

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                       (02063)
A5D 04460 427B427B (02064)      MOV(EXO),ADD(A3,A2)             EX=RI\RR
A5E 04462 08560856 (02065)      MOV(EXI,A6)                     A6=RR\RI
                       (02066)
A5F 04464 47D447D4 (02067)      MOV(A4),ADD(A6,A7)              A4=PI\PR
A60 04466 4D9C0000 (02068)      MOV(OO),SUB(A4,A5)\NOP          OO=ZR
A61 04468 00004D9C (02069)      NOP\MOV(OO),SUB(A4,A5)          OO=ZI
A62 0446A 4FDC0000 (02070)      MOV(OO),SUB(A6,A7)\NOP          OO=YI
A63 0446C 00004FDC (02071)      NOP\MOV(OO),SUB(A6,A7)          OO=YR
A64 0446E 204A204A (02072)      SET(AF2)                        APS/OTPT STAGE DN
A65 04470 459C0000 (02073)      MOV(OO),ADD(A4,A5)\NOP          OO=XR
A66 04472 0000459C (02074)      NOP\MOV(OO),ADD(A4,A5)          OO=XI
A67 04474 089C0000 (02075)      MOV(R,OO)\NOP                   OO=WR
A68 04476 0000089C (02076)      NOP\MOV(R,OO)                   OO=WI
                       (02077)
A69 04478 901D0029 (02078)      JUMPC(CR4ESA,FI)
                       (02079)
A6A 0447A 20322032 (02080)      CLEAR(RA)
A6B 0447C 00000000 (02081)      NOP
A6C 0447E 10000000 (02082)      JUMP(CSM2$SA)
                       (02083) ;
          0000006D (02084)      CR4$SZ = #A-CSM2$SA
    04480              (02085)      END
                       (02086) ;
                       (02087)
                       (02088)
                       (02089) ;
```

```
                            '         SCRAMBLE AND FIRST RADIX-2 STAGE, REVERSE
                            ; 03/08/78
                            ; SCRAMBLE AND FIRST STAGE OF IFFT,G1 SET
                            ;
                            ; FUNCTION
                            ; LETTING EIGHT SUCESSIVE INPUTS BEING DESIGNATED BY
                            ;       RU0,RU1,IU1,IU0,IU2,IU3,RU3,RU2
                            ; THE EIGHT OUTPUTS ARE PROVIDED
                            ;       RU0+RU1,RU0-RU1,IU0+IU1,IU0-IU1
                            ;          IU2+IU3,IU2-IU3,RU2+RU3,RU2-RU3
                            ; FOR RELATIONSHIP OF INPUTS TO U(K), AND OUTPUTS TO Y(K),
                            ; SEE SUPPORTING APS PROGRAM, CSM
                            ;
                            ;
                            ;BINDING SECTION FOR EXEC
                            ;
                                    EVEN
    04480 0000                      DATA ISM2$SA
    04481 006D                      DATA CR41$SZ
                                    EVEN
                            ;
                            ;
                            ISM2$   BEGIN APU(ISM2)
          00000000                  $A=00
                            ;
A00 04482 9005000D          ISM2$SA JUMPC(CSM41, G1)
A01 04484 10000003                  JUMP(ISM2E)
                            ;
A02 04486 089C089C          ISM2L   MOV(R,OO)                                OO=IYO\IY1
                            ;
A03 04488 08F008F0          ISM2E   MOV(IOA,A0)                              A0=RU0
A04 0448A 08F108F1                  MOV(IOA,A1)                              A1=RU1
A05 0448C 41004900                  ADD(A0,A1)\SUB(A0,A1)
                            ;
A06 0448E 08F308F3                  MOV(IOA,A3)                              A3=IU1
A07 04490 08F208F2                  MOV(IOA,A2)                              A2=IU0
A08 04492 435C4B5C                  MOV(OO),ADD(A2,A3)\MOV(OO),SUB(A2,A3)    OO=RYO\RY1
                            ;
A09 04494 90160002                  JUMPC(ISM2L,EWI)
                            ;
A0A 04496 089C089C                  MOV(R,OO)                                OO=IYO\IY1
                            ;
A0B 04498 00000000                  NOP
A0C 0449A 10000028                  JUMP(CR41S)
```

```
                       (02134) '          SCRAMBLE AND FIRST RADIX-4 STAGE, REVERSE
                       (02135) ; SCRAMBLE AND RADIX 4 STAGE OF IFFT,G1 CLEAR
                       (02136) ;
                       (02137) ; FUNCTION
                       (02138) ; THE EIGHT SUCESSIVE INPUTS ARE PROVIDED TO LOOP
                       (02139) ; RU0,RU1,IU1,IU0,IU2,IU3,RU3,RU2
                       (02140) ; THE INTERMEDIATE RADIX TWO RESULTS ARE CALCULATED
                       (02141) ; S0=U0+U1,S1=U0-U1,S2=U2+U3,S3=U2-U3
                       (02142) ; THE OUTPUTS THEN BEING GIVEN BY
                       (02143) ; Y0=S0+S2,Y1=S1+JS3,Y2=S0-S2,Y3=S1-JS3
                       (02144) ; THE ACTUAL OUTPUT SEQUENCE BEING
                       (02145) ; RY0,RY1,IY0,IY1,IY2,IY3,RY2,RY3
                       (02146) ;
                       (02147) ; APU INITIALIZATION
                       (02148) ;
                       (02149) ;
A0D 0449C 0BF00BF0 (02150) CSM4I    MOV(IQA,A0)                                    A0=RU0\RU0
A0E 0449E 0BF10BF1 (02151)          MOV(IQA,A1)                                    A1=RU1\RU1
A0F 044A0 0BF30BF3 (02152)          MOV(IQA,A3)                                    A3=IU1\IU1
A10 044A2 41004900 (02153)          ADD(A0,A1)\SUB(A0,A1)
A11 044A4 0BF20BF2 (02154)          MOV(IQA,A2)                                    A2=IU0\IU0
A12 044A6 1000001B (02155)          JUMP(CSM4I$)
                       (02156) ;
                       (02157) ;
                       (02158) ; CSM4I, APU INNER LOOP
                       (02159)
A13 044A8 46BC47BC (02160) #1       MOV(OQ),ADD(A5,A6)\MOV(OQ),ADD(A5,A7)          OQ=RY0\RY1
A14 044AA 0BF00BF0 (02161)          MOV(IQA,A0)                                    A0=RU0
                       (02162)
A15 044AC 4EBC4FBC (02163)          MOV(OQ),SUB(A5,A6)\MOV(OQ),SUB(A5,A7)          OQ=IY0\IY1
A16 044AE 0BF10BF1 (02164)          MOV(IQA,A1)                                    A1=RU1
                       (02165)
A17 044B0 4E9C469C (02166)          MOV(OQ),SUB(A4,A7)\MOV(OQ),ADD(A4,A6)          OQ=IY2\IY3
A18 044B2 0BF30BF3 (02167)          MOV(IQA,A3)                                    A3=IU1
                       (02168)
A19 044B4 411C491C (02169)          MOV(OQ),ADD(A0,A1)\MOV(OQ),SUB(A0,A1)          OQ=RY2\RY3
A1A 044B6 0BF20BF2 (02170)          MOV(IQA,A2)                                    A2=IU0
                       (02171)
A1B 044B8 43544B54 (02172) CSM4I$   MOV(A4),ADD(A2,A3)\MOV(A4),SUB(A2,A3)          A4=RS0\RS1
A1C 044BA 0BF00BF0 (02173)          MOV(IQA,A0)                                    A0=IU2
A1D 044BC 0BF10BF1 (02174)          MOV(IQA,A1)                                    A1=IU3
                       (02175)
A1E 044BE 41154915 (02176)          MOV(A5),ADD(A0,A1)\MOV(A5),SUB(A0,A1)          A5=IS0\IS1
A1F 044C0 0BF30BF3 (02177)          MOV(IQA,A3)                                    A3=RU3
```

SCRAMBLE AND FIRST RADIX-4 STAGE, REVERSE

```
A20 044C2 08F208F2 (02178)       MOV(10A,A2)                                  A2=RU2
                   (02179)
A21 044C4 43564856 (02180)       MOV(A6),ADD(A2,A3)\MOV(A6),SUB(A2,A3)        A6=IS2\IS3
                   (02181)
A22 044C6 47974F97 (02182)       MOV(A7),ADD(A4,A7)\MOV(A7),SUB(A4,A6)        A7=RS2\RS3
                   (02183)
A23 044C8 90160013 (02184)       JUMPC(#1,FWI)
                   (02185)
A24 044CA 46BC47BC (02186)       MOV(OQ),ADD(A5,A6)\MOV(OQ),ADD(A5,A7)        OQ=RY0\RY1
A25 044CC 4EBC4FBC (02187)       MOV(OQ),SUB(A5,A6)\MOV(OQ),SUB(A5,A7)        OQ=IY0\IY1
A26 044CE 4F9C469C (02188)       MOV(OQ),SUB(A4,A7)\MOV(OQ),ADD(A4,A6)        OQ=IY2\IY3
A27 044D0 089C089C (02189)       MOV(R,OQ)                                    OQ=RY2\RY3
```

```
'          SUCCESSIVE RADIX-4 STAGES, REVERSE
;
;USES APS PROGRAM CR4A
;
;MATHEMATICS
;
; W=A+BE+CE2+DE3=P+Q
; X=A+JBE-CE2-JDE3=R+S
; Y=A-BE+CE2-DE3=P-Q
; Z=A-JBE-CE2+JDE3=R-S

; P=A+CE2,R=A-CE2
; Q=E(B+DE2),S=JE(B-DE2)

; PR=AR+CRCOS2X-CISIN2X
; PI=AI+CICOS2X+CRSIN2X
; RR=AR-CRCOS2X+CISIN2X
; RI=AI-CICOS2X-CRSIN2X
; QR=BRCOSX-BISINX+DRCOS3X-DISIN3X
; QI=BICOSX+BRSINX+DICOS3X+DRSIN3X
; SR=BICOSX-BRSINX+DICOS3X-DRSIN3X
; SI=BRCOSX-BISINX-DRCOS3X+DISIN3X
;
; SINX STORED IN M1\M5
; SIN2X STORED IN M6\M2
; SIN3X STORED IN M7\M3
; COSX STORED IN M5\M1
; COS2X STORED IN M2\M6
; COS3X STORED IN M3\M7

         EJECT
```

```
                     (02221) ;CR4I-PIPELINE STARTUP
                     (02222)
                     (02223)
A28 044D2 202A202A (02224) CR4IS   CLEAR(AF2)
A29 044D4 20292029 (02225) CR4ISA  CLEAR(AF1)
A2A 044D6 20282028 (02226)         CLEAR(AF0)
                     (02227)
A2B 044D8 16801680 (02228)         K(1)
A2C 044DA 08090BF0 (02229)         MOV(ZERO,M1)\MOV(IOA,A0)        A0=DI\DR
A2D 044DC 0BF0080D (02230)         MOV(IOA,A0)\MOV(ZERO,M5)        SINX=0=M1\M5
                     (02231)
                     (02232)
A2E 044DE 08BD08B9 (02233)         MOV(R,M5)\MOV(R,M1)             COSX=1=M5\M1
A2F 044E0 08BA08BE (02234)         MOV(R,M2)\MOV(R,M6)             COS2X=1=M2\M6
A30 044E2 08BB08BF (02235)         MOV(R,M3)\MOV(R,M7)             COS3X=1=M3\M7
                     (02236)
A31 044E4 0BF1080A (02237)         MOV(IOA,A1)\MOV(ZERO,M2)        A1=BI\BR
A32 044E6 080E0BF1 (02238)         MOV(ZERO,M6)\MOV(IOA,A1)        SIN2X=0=M6\M2
A33 044E8 080F080B (02239)         MOV(ZERO,M7)\MOV(ZERO,M3)       SIN3X=0=M7\M3
                     (02240)
A34 044EA 0BF80BF8 (02241)         MOV(IOA,M0)                     M0=CR
A35 044EC 84408440 (02242)         MUL(M0,M6)                      P=CRSIN2X\CRCOS2X
A36 044EE 0A200220 (02243)         NEG(A1)\R(A1)                   R=-BI\BR
                     (02244)
A37 044F0 10000053 (02245)         JUMP(CR4IE)
                     (02246)
                     (02247) ;CR4I-COSINE ENTRY
                     (02248) ;
A38 044F2 0BFD0BF9 (02249) CR4IC   MOV(IOA,M5)\MOV(IOA,M1)         COSX TO M5\M1
A39 044F4 0BF90BFD (02250)         MOV(IOA,M1)\MOV(IOA,M5)         SINX TO M1\M5
A3A 044F6 08A008A0 (02251)         MOV(P,NULL)
A3B 044F8 0BFE0BFA (02252)         MOV(IOA,M6)\MOV(IOA,M2)         SIN2X TO M6\M2
A3C 044FA 0BFA0BFE (02253)         MOV(IOA,M2)\MOV(IOA,M6)         COS2X TO M2\M6
A3D 044FC 0BFB0BFF (02254)         MOV(IOA,M3)\MOV(IOA,M7)         COS3X TO M3\M7
A3E 044FE 0BFF0BFB (02255)         MOV(IOA,M7)\MOV(IOA,M3)         SIN3X TO M7\M3
                     (02256) ;
                     (02257) ;CR4I-BUTTERFLY
                     (02258)
A3F 04500 0BF80BF8 (02259) CR4IB   MOV(IOA,M0)                     DR TO M0
A40 04502 84748474 (02260)         MOV(A4),MUL(M0,M7)\MOV(A4),MUL(M0,M7)   A4=CICOS2X\-CISIN2X
A41 04504 4A954455 (02261)         MOV(A5),SUB(A4,A2)\MOV(A5),ADD(A2,A4)   A5=DI\DR
A42 04506 0BFC0BFC (02262)         MOV(IOA,M4)                     DI TO M4
A43 04508 4A724A72 (02263)         MOV(A2),SUB(A3,A2)              A2=CICOS2X+CRSIN2X
                     (02264) ;                                      \-CISIN2X+CRCOS2X
```

```
                          (02265)
                          (02266)
A44 0450A 8590B590 (02267)          MOV(A0),MUL(M3,M4)\MOV(A0),MUL(M3,M4)     A0=-DRSIN3X\DRCOS3X
A45 0450C 427B127B (02268)          MOV(EX0),ADD(A3,A2)                       EX=RI\RR
A46 0450E 0B560B56 (02269)          MOV(EXI,A6)                               A6=RR\RI
A47 04510 0BFB0BFB (02270)          MOV(IOA,M0)                               RI TO M0
A48 04512 4F044FD4 (02271)          MOV(A4),SUB(A6,A7)                        A4=PI\PR
                          (02272)
                          (02273)
A49 04514 84318431 (02274)          MOV(A1),MUL(M0,M5)\MOV(A1),MUL(M0,M5)     A1=DICOS3X\-DISIN3X
A4A 04516 483C403C (02275)          MOV(OO),SUB(A1,A0)\MOV(OO),ADD(A1,A0)     OO=ZR\ZI
A4B 04518 0BFC0BFC (02276)          MOV(IOA,M4)                               RR TO M4
A4C 0451A 4D904D90 (02277)          MOV(A0),SUB(A4,A5)                        A0=DICOS3X+DRSIN3X
                          (02278) ;                                              \-DISIN3X+DRCOS3X
                          (02279)
                          (02280)
                          (02281)
A4D 0451C 84918491 (02282)          MOV(A1),MUL(M1,M4)\MOV(A1),MUL(M1,M4)     A1=BICOSX\-BISINX
A4E 0451E 47DC47DC (02283)          MOV(OO),ADD(A6,A7)                        OO=YI\YR
A4F 04520 0BF80BF8 (02284)          MOV(IOA,M0)                               CR TO M0
A50 04522 459C459C (02285)          MOV(OO),ADD(A4,A5)                        OO=XR\XI
                          (02286)
                          (02287)
A51 04524 84528452 (02288)          MOV(A2),MUL(M0,M6)\MOV(A2),MUL(M0,M6)     A2=-BRSINX\BRCOSX
A52 04526 495C423C (02289)          MOV(OO),SUB(A2,A1)\MOV(OO),ADD(A1,A2)     OO=WR\WI
A53 04528 0BFC0BFC (02290) CR4IF    MOV(IOA,M4)                               CI TO M4
A54 0452A 41114831 (02291)          MOV(A1),ADD(A0,A1)\MOV(A1),SUB(A1,A0)     A1=-BRSINX-BICOSX
                          (02292) ;                                              \BRCOSX-BISINX
                          (02293)
                          (02294)
A55 0452C 85128512 (02295)          MOV(A2),MUL(M2,M4)\MOV(A2),MUL(M2,M4)     A2=-CRSIN2X\CRCOS2X
A56 0452E 0BF34037 (02296)          MOV(IOA,A3)\MOV(A7),ADD(A1,A0)            A3=AI \ A7=SI
A57 04530 49170BF3 (02297)          MOV(A7),SUB(A0,A1)\MOV(IOA,A3)            A7=SR \ A3=AR
A58 04532 9028003F (02298)          JUMPC(CR4IF,AF0),CLEAR                    AF1;STAGE DONE
A59 04534 90290038 (02299)          JUMPC(CR4IC,AF1),CLEAR                    AF0;COSINES USED
                          (02300)
                          (02301)
                          (02302) ; CR4I-PIPELINE CLEANUP
A5A 04536 0B840B84 (02303)          MOV(P,A4)                                 A4=CICOS2X\-CISIN2X
                          (02304)
                          (02305)
A5B 04538 4A954455 (02306)          MOV(A5),SUB(A4,A2)\MOV(A5),ADD(A2,A4)     A5=QI\QR
A5C 0453A 4A724A72 (02307)          MOV(A2),SUB(A3,A2)                        A2=CICOS2X+CRSIN2X
                          (02308) ;                                              \-CISIN2X+CRCOS2X
```

```
                        (02309)
A5D 0453C 427R427R (02310)      MOV(FXO),ADD(A3,A2)            EX=RI\RR
A5E 0453E 08560856 (02311)      MOV(FXI,A6)                    A6=RR\RI
                        (02312)
A5F 04540 4FD44FD4 (02313)      MOV(A4),SUB(A6,A7)             A4=PI\PR
A60 04542 409C0000 (02314)      MOV(OO),SUB(A4,A5)\NOP         OO=ZR
A61 04544 0000409C (02315)      NOP\MOV(OO),SUB(A4,A5)         OO=ZI
A62 04546 47DC0000 (02316)      MOV(OO),ADD(A6,A7)\NOP         OO=YI
A63 04548 000047DC (02317)      NOP\MOV(OO),ADD(A6,A7)         OO=YR
A64 0454A 204A204A (02318)      SET(AF2)                       APS/OTPT STAGE DN
A65 0454C 459C0000 (02319)      MOV(OO),ADD(A4,A5)\NOP         OO=XR
A66 0454E 0000459C (02320)      NOP\MOV(OO),ADD(A4,A5)         OO=XI
A67 04550 089C0000 (02321)      MOV(R,OO)\NOP                  OO=WR
A68 04552 0000089C (02322)      NOP\MOV(R,OO)                  OO=WI
                        (02323)
A69 04554 90100029 (02324)      JUMPC(CR4ISA,FI)
                        (02325)
A6A 04556 20322032 (02326)      CLEAR(RA)
A6B 04558 00000000 (02327)      NOP
A6C 0455A 10000000 (02328)      JUMP(ISM2SSA)
                        (02329) ;
          0000006D (02330)      CR4ISSZ = #A-ISM2SSA
    0455C              (02331)      END
                        (02332) ;
                        (02333)
                        (02334)
                        (02335)
                        (02336)
                        (02337)
                        (02338)
                        (02339) ;
```

```
               (02340) *   APS PROGRAMS
               (02341) ;
               (02342) ;
               (02343) ; START OF HEADER BLOCK
               (02344) ;
               (02345)       EVEN                  START ON WORD BOUNDARY
0455C 00004664 (02346)       ADDR CSMSI            PTR TO CONSTR INSTR BLOCK(NONE)
04551 00004564 (02347)       ADDR CSMS+2*CSMSS     PTR TO SCALAR BLOCK (NONE)
04560 0000     (02348)       DATA 0                NO SCALARS
04561 0100     (02349)       DATA CR4ASZ           MODULE SIZE
04562 00000000 (02350)       ADDR CR4ASA           PTR TO CHAIN ANCHOR
               (02351)       EVEN                  END OF BOUNDARY
               (02352) ;
               (02353) ;
```

```
                  (02354) '          CSM - COMPLEX FFT SCRAMBLE (P0 - INPUT)
                  (02355) ; APS PROGRAM PROVIDING SCRAMBLE FOR COMPLEX FFT
                  (02356) ; MAY BE USED WITH THE MAP-300 APU PROGRAMS
                  (02357) ; CSM2(Y,U), CSM4F(Y,U), CSM4T(Y,U)
                  (02358) ;
                  (02359) ; RESTRICTIONS
                  (02360) ; IN PLACE OPERATION NOT PERMITTED
                  (02361) ; BUFFER SIZES MUST BE 1024 OR LESS
                  (02362) ; Y BUFFER MUST BE COMPACT 32 BIT FLOATING
                  (02363) ;
                  (02364) ;
                  (02365) ; BINDING PARAMETERS
                  (02366) ;
                  (02367) ;          N=# OF POINTS IN FFT (USIZE)
                  (02368) ;          HU=USEP*N/2
                  (02369) ;          QU=HU/2
                  (02370) ; APS-INPUT ADDRESS SEQUENCE
                  (02371) ; RU(K), RU(K+N/2), IU(K+N/2), IU(K), IU(K+N/4)
                  (02372) ; IU(K+3N/4), RU(K+3N/4), RU(K+N/4)], FOR 0<=K<N/4
                  (02373) ; THUS PROVIDING REVERSAL OF TWO BITS
                  (02374) ;
                  (02375) ; APS-OUTPUT ADDRESS SEQUENCE
                  (02376) ; RW(J), RW(J+1), IW(J), IW(J+1), RW(J+2),
                  (02377) ; RW(J+3), IW(J+2), IW(J+3)
                  (02378) ; WHERE J= BIT REVERSAL OF K
                  (02379) ; THE DIFFERENCE, D(K) = J(K+1)-J(K) IS
                  (02380) ; PROVIDED BY THE P3 SUBROUTINE
                  (02381) ;
                  (02382) ;
                  (02383) CSMS     BEGIN APS(CSM)
                  (02384) ;
A00 04564 00702540 (02385) CSMSS    JSN(CSMU,P2)
                  (02386) ;
A01 04566 02C00000 (02387) CSML6S   LOAD(BRO,MSS,L,TF)           INPT RU(0) [UBASE BOUND]
A02 04568 04500000 (02388) CSML0S   LOAD(BR1,MSS)                [USIZE-1 BOUND]
A03 0456A 06300672 (02389)          JUMP(CSMF,RA),SET            TURN ON APU
                  (02390) ;
A04 0456C 08820000 (02391) CSML     SUB(BRO,MSS,TF)              INPT RU(K+N/4) [HU BOUND]
                  (02392) ;
A05 0456E 0A820000 (02393) CSML1S   SUB(BRO,MSS,TF)              INPT RU(K) [QU-USEP BOUND]
A06 04570 0CHA0000 (02394) CSMF     ADD(BRO,MSS,TF)              INPT RU(K+N/2) [HU BOUND]
A07 04572 0E8A0002 (02395)          ADD(BRO,2,TF)                INPT IU(K+N/2)
A08 04574 10820000 (02396) CSML2S   SUB(BRO,MSS,TF)              INPT IU(K) [HU BOUND]
                  (02397) ;
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```
 A09 04576 128A0000 (02398) CSML3S  ADD(BR0,MSS,TF)               INPT IU(K+N/4) (QU BOUND)
 A0A 04578 148A0000 (02399) CSML4S  ADD(BR0,MSS,TF)               INPT IU(K+3N/4) (HU BOUND)
 A0B 0457A 16820002 (02400)         SUB(BR0,2,TF)                 INPT RU(K+3N/4)
                    (02401) ;
 A0C 0457C 18190484 (02402)         SUBL(BR1,4),JUMPP(CSML)
                    (02403) ;
 A0D 0457E 1A820000 (02404) CSML5S  SUB(BR0,MSS,TF)               INPT RU(LAST) (HU BOUND)
 A0E 04580 1C305977 (02405)         JUMP(CR4AF,WI),SFT
                    (02406) ;
```

```
                         (02407) *          CSM-SCRAMBLE SUBROUTINE (P3 - OUTPUT)
                         (02408) ;
                         (02409) ; DATA POINT ADDRESS AT ENTRY 4*[J(K)-N]+WBASE
                         (02410) ; DATA OUTPUT ADDRESS GENERATED [4J(K+1)]+WBASE
                         (02411) ;
                         (02412) ; ITERATION EQUATION, J=J(K)=K,BIT REVERSED
                         (02413) ; 4J(K+1)=4*[J(K)-N]+DM
                         (02414) ; WHERE M=NUMBER OF TRAILING 1'S IN (K)
                         (02415) ;
                         (02416) ; BINDING CONSTANTS
                         (02417) ;
                         (02418) ;          D0=4*(3*N/2)
                         (02419) ;          D1=D0/2
                         (02420) ;          D2=D1/2
                         (02421) ;          D3=D2/2
                         (02422) ;          D4=D3/2
                         (02423) ;          D5=D4/2
                         (02424) ;          D6=D5/2
                         (02425) ;          D7=D6/2
                         (02426) ;;
                         (02427) ;
A0F 04582 1F107840 (02428) SCRM    JSN(ANGLE,P1)                LOADS P1 FOR CR4A
                         (02429) ;
A10 04584 20BE0000 (02430) SCRM0   ADD(BW0,MSS,TF,C)            [D0 BOUND]
A11 04586 22BE0000 (02431) SCRM1S  ADD(BW0,MSS,TF,C)            [D1 BOUND]
A12 04588 24BE0000 (02432) SCRM2S  ADD(BW0,MSS,TF,C)            [D0 BOUND]
A13 0458A 26BE0000 (02433) SCRM3S  ADD(BW0,MSS,TF,C)            [D2 BOUND]
A14 0458C 28BE0000 (02434) SCRM4S  ADD(BW0,MSS,TF,C)            [D0 BOUND]
A15 0458E 2ABE0000 (02435) SCRM5S  ADD(BW0,MSS,TF,C)            [D1 BOUND]
A16 04590 2CBE0000 (02436) SCRM6S  ADD(BW0,MSS,TF,C)            [D0 BOUND]
                         (02437) ;
A17 04592 2E201AE8 (02438)         JUMPS(SCRM4,AF0),CLEAR
A18 04594 30BE0000 (02439) SCRM7S  ADD(BW0,MSS,TF,C)            [D3 BOUND]
A19 04596 37301068 (02440)         JUMP(SCRM0,AF0),SET
                         (02441) ;
A1A 04598 34201DE9 (02442) SCRM4   JUMPS(SCRM5,AF1),CLEAR
A1B 0459A 36BE0000 (02443) SCRM8S  ADD(BW0,MSS,TF,C)            [D4 BOUND]
A1C 0459C 38301069 (02444)         JUMP(SCRM0,AF1),SET
                         (02445) ;
                         (02446) ;
A1D 0459E 3A2020EA (02447) SCRM5   JUMPS(SCRM6,AF2),CLEAR
A1E 045A0 3CBE0000 (02448) SCRM9S  ADD(BW0,MSS,TF,C)            [D5 BOUND]
A1F 045A2 3E30106A (02449)         JUMP(SCRM0,AF2),SET
                         (02450) ;
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```
A20 045A4 402023FB (02451) SCRM6    JUMPS(SCRM7,AF3),CLEAR
A21 045A6 428F0000 (02452) SCRM10$ ADD(HWO,MSS,TF,C)              [D6 BOUND]
A22 045A8 4430106B (02453)          JUMP(SCRM0,AF3),SET
                   (02454) ;
A23 045AA 468F0000 (02455) SCRM7    ADD(HWO,MSS,TF,C)              [D7 BOUND]
A24 045AC 48001060 (02456)          JUMP(SCRM0)
                   (02457) ;
```

```
                       (02458) '         CSM-SCRAMBLE SUBROUTINE (OUTPUT - P2)
                       (02459) ;
                       (02460) ;
  A25 045AE 4A300F40 (02461) CSMO     JSN(SCRM,P3)
  A26 045B0 4CC00000 (02462) CSMO1S   LOAD(BWO,MSS,L,TF)              OTPT RW(0) (WBASE BOUND)
  A27 045B2 4F112953 (02463)          MOVB(BW1,BR1),JUMP(CSMOE)       BW1=WSIZE-1
                       (02464) ;
  A28 045B4 50060000 (02465) CSMOL    SUB(BWO,MSS,C)                  (4N+12 BOUND)
                       (02466) ;
                       (02467) ; PRIOR TO JUMP TO P3,BWO=4J(K)-4N
                       (02468) ; SCRAMBLE SUBROUTINE OUTPUTS RW(J)
                       (02469) ; LEAVING BWO=4J(K+1)
                       (02470)
  A29 045B6 52BA0004 (02471) CSMOE    ADD(BWO,4,TF)                   OTPT RW(J+1)
  A2A 045B8 54B20002 (02472)          SUB(BWO,2,TF)                   OTPT IW(J)
  A2B 045BA 56BA0004 (02473)          ADD(BWO,4,TF)                   OTPT IW(J+1)
                       (02474) ;
  A2C 045BC 58BA0004 (02475)          ADD(BWO,4,TF)                   OTPT IW(J+2)
  A2D 045BE 5ABA0004 (02476)          ADD(BWO,4,TF)                   OTPT IW(J+3)
  A2E 045C0 5CB20006 (02477)          SUB(BWO,6,TF)                   OTPT RW(J+2)
  A2F 045C2 5EBA0004 (02478)          ADD(BWO,4,TF)                   OTPT RW(J+3)
                       (02479) ;
  A30 045C4 60112BB4 (02480)          SUBL(BW1,4),JUMPP(CSMOL)
                       (02481) ;
```

```
'          SUCCESSIVE RADIX-4 STAGES (OUTPUT - P2)
;          PROGRAM ASSUMES SCRAMBLE COMPLETED


; 12/14/77
; SCRAMBLE LEAVES APS AS FOLLOWS
; INPUT - LAST COMMAND,JUMP(CR4AF,WI),SET
; INPUT-P1 LOCATED AT ANGLE
; OUTPUT - ACTIVE, IN P2
;
; SS=STAGE SEPARATION, DATA SEPARATION A B C D
; STARTING VALUES(/4)ARE
; SSI=1, SCRAMBLE ONLY PRECEEDING        N=4^M
; SSI=2, SCRAMBLE PLUS RADIX2 PRECEEDING N=2*4^M
; SSI=3, SCRAMBLE PLUS RADIX3 PRECEEDING N=3*4^M
; SSI=4, SCRAMBLE PLUS RADIX4 PRECEEDING N=4*4^M
; SSI=6, SCRAMBLE PLUS RADIX6 PRECEEDING N=6*4^M
;
;
; COSINE TABLE IS A REAL BUFFER WITH CONTENTS:
;     CT(K)=COS(2*PI*K/CSIZE)
; RESTRICTION.
; CSIZE MUST BE MULTIPLE OF N, FFT SIZE
;
; COSINE TABLE BINDING PARAMETERS
;
;          HPI=CSEP*(CSIZE/4)            90 DEG SEPARATION
;
; REGISTER USAGE
;          BR0/BW0                       DATA ADDRESSES
;          BR1/BW1                       # OF USES OF A COSINE, COUNTER
;          BW2                           # OF COSINES USED, COUNTER
;          BW3                           STAGE SEPARATION
;          BR2                           SEP BETWEEN COSINES WITHIN A SET
;          BR3                           SEP BETWEEN SETS OF COSINES
         EJECT
```

```
                     (02518)
A31 045C6 62700000 (02519) CR4A01 LOAD(RW3,MSS)                        [SSI BOUND]
                     (02520) ;
                     (02521) ;  CR4A-APS OUTPUT PROGRAM-STAGE INITIALIZATION
                     (02522) ;
                     (02523) ;
A32 045C8 6431002F (02524) CR4A02  ADDR(RW3,RW3)
A33 045CA 6631002F (02525)         ADDR(RW3,RW3)                   SET SEPARATION FOR STAGE
A34 045CC 68400000 (02526) CR4A1S  LOAD(RW0,MSS)                   SET RW0=WR-4 [WBASE BOUND]
A35 045CE 6A010034 (02527)         SUBL(RW0,4)                     SET WBASE-4
A36 045D0 6C210016 (02528)         MOVR(RW2,RW3)
A37 045D2 6E090010 (02529)         MOVR(RK0,RW0)                   SET UP INPUT BASE
A38 045D4 70200037 (02530)         CLEAR(W1)                       START UP INPUT
                     (02531) ;
                     (02532) ;TEST FOR LAST STAGE
                     (02533) ; IF SO, CHANGE OUTPUT TO Y BUFFER INSTEAD
                     (02534) ; OF THE W BUFFER
                     (02535) ;
A39 045D6 72500000 (02536) CR4A3S  LOAD(RW1, MSS)                  [USIZE-1 BOUND]
A3A 045D8 741149A6 (02537)         SUBR(RW1, RW3), JUMPP(CR4A03) JUMP IF NOT LAST STAGE
                     (02538) ;
                     (02539) ;LAST STAGE OUTPUT ADDRESSES
                     (02540) ;
A3B 045DA 76400000 (02541) CR4A10S LOAD(RW0, MSS)                  [YBASE BOUND]
A3C 045DC 78500000 (02542) CR4A11S LOAD(RW1, MSS)                  [YSEP*YSIZE/4 BOUND]
                     (02543) ;
A3D 045DE 7A0A0000 (02544) CR4A0F  ADD(RW0, MSS)                   [YSEP*YSIZE BOUND]
                     (02545) ;
A3E 045E0 7C810022 (02546)         SUBR(RW0,RW1,TF)                ZR
A3F 045E2 7E8A0002 (02547)         ADD(RW0,2,TF)                   ZI
A40 045E4 80810022 (02548)         SUBR(RW0,RW1,TF)                YI
A41 045E6 82820002 (02549)         SUB(RW0,2,TF)                   YR
A42 045E8 84810022 (02550)         SUBR(RW0,RW1,TF)                XR
A43 045EA 868A0002 (02551)         ADD(RW0,2,TF)                   XI
A44 045EC 88810022 (02552)         SUBR(RW0,RW1,TF)                WI
A45 045EE 8A820002 (02553)         SUB(RW0,2,TF)                   WR
                     (02554) ;
                     (02555) ;TEST FFT DONE
                     (02556) ;
A46 045F0 8C0A0000 (02557) CR4A12S ADD(RW0,MSS)                    [YSEP BOUND]
A47 045F2 8E203DAA (02558)         JUMPC(CR4A0F,AF2),CLEAR
A48 045F4 90203470 (02559)         JUMP(CR4A1S,R0),CLEAR           HALT APS OUTPUT
                     (02560)
A49 045F6 92500000 (02561) CR4A03  LOAD(RW1,MSS)                   SET BUTTERFLY COUNT [USIZE-1 BOUND]
```

```
 A4A 045F8 940A0000 (02562) CR4A2$  ADD(BW0,MSS)                SET STARTING ADDRESS [4N+4 BOUND]
                    (02563)
                    (02564)
 A4B 045FA 96810026 (02565) CR4A04  SUBB(BW0,BW3,TF)            ZR
 A4C 045FC 988A0002 (02566)         ADD(BW0,2,TF)               ZI
 A4D 045FE 9A810026 (02567)         SUBB(BW0,BW3,TF)            YI
 A4E 04600 9C820002 (02568)         SUB(BW0,2,TF)               YR
 A4F 04602 9E810026 (02569)         SUBB(BW0,BW3,TF)            XR
 A50 04604 A08A0002 (02570)         ADD(BW0,2,TF)               XI
 A51 04606 A2810026 (02571)         SUBB(BW0,BW3,TF)            WI
 A52 04608 A4820002 (02572)         SUB(BW0,2,TF)               WR
                    (02573) ;TEST FOR NEW COSINES, ELSE OUTPUT NEXT 4 POINTS
                    (02574) ;
 A53 0460A A61148A6 (02575)         SUBB(BW1,BW3),JUMPP(CR4A04)
                    (02576) ;TEST STAGE DONE, ELSE GET NEW COSINES
                    (02577) ;
 A54 0460C A82049AA (02578)         JUMPC(CR4A03,AF2),CLEAR
                    (02579) ;
                    (02580) ;STOPPING SHORT CHECK IS HERE
                    (02581) ;
 A55 0460E AA500000 (02582) CR4A13$ LOAD(BW1, MSS)              [FFTSIZE-1 BOUND]
 A56 04610 AC1132A6 (02583)         SUBB(BW1, BW3), JUMPP(CR4A02)
 A57 04612 AE203470 (02584)         JUMP(CR4A1$, R0), CLEAR     HALT APS OUTPUT
                    (02585) ;
                    (02586)
```

```
                    (02587) *         SUCCESSIVE RADIX-4 STAGES (INPUT - P0)
                    (02588)
A58 04614 B0300037 (02589) CR4A1   SET(W1)
                    (02590) ;STAGE INITIALIZATION
                    (02591) ;
A59 04616 B2600000 (02592) CR4AF   LOAD(BR2,0)                    SET COSINE VALUE=0
A5A 04618 B4300015 (02593)         MOVB(BR3,BR2,C)
                    (02594) ;
                    (02595) ; ANGLE SUBROUTINE,P1,INSERTS COSINE SEPARATION
                    (02596) ; FOR STAGE INTO BR3
                    (02597)
                    (02598)
A5B 0461A B6216571 (02599)         SUBL(BW2,1),JUMP(CR4A3)        BW2=#OF COSINES-1
                    (02600)
A5C 0461C B8890032 (02601) CR4A2   SUBL(BR0,2,TF)                 AR
                    (02602) ;COSINE ENTRY
                    (02603) ;
A5D 0461E BA500000 (02604) CR4A4S  LOAD(BR1,MSS,L)                (CHASE BOUND)
A5E 04620 BC29002F (02605)         ADDB(BR2,BR3)                  BR2=NEXT ANGLE
                    (02606)
A5F 04622 BE99002D (02607)         ADDB(BR1,BR2,TF)               COSX
A60 04624 C09A0000 (02608) CR4A5S  ADD(BR1,MSS,TF)                SINX [HPI BOUND]
A61 04626 C299002D (02609)         ADDB(BR1,BR2,TF)               SIN2X
A62 04628 C4920000 (02610) CR4A6S  SUB(BR1,MSS,TF)                COS2X [HPI BOUND]
A63 0462A C699002D (02611)         ADDB(BR1,BR2,TF)               COS3X
A64 0462C C89A0000 (02612) CR4A7S  ADD(BR1,MSS,TF)                SIN3X [HPI BOUND]
A65 0462E CA0A0000 (02613) CR4A3   ADD(BR0,MSS)                   SET BR0 TO 4N+COS# [4N+4 BOUND]
A66 04630 CC500000 (02614) CR4A8S  LOAD(BR1,MSS)                  SET COSINE USE COUNTER [USIZE-1 BOUND]
                    (02615)
                    (02616) ; CR4A-APS BUTTERFLY INPUT
                    (02617) ;
                    (02618)
A67 04632 CE890026 (02619) CR4A4   SUBB(BR0,BW3,TF)               DR
A68 04634 D089003A (02620)         ADDL(BR0,2,TF)                 DI
A69 04636 D2890026 (02621)         SUBB(BR0,BW3,TF)               BI
A6A 04638 D4890032 (02622)         SUBL(BR0,2,TF)                 BR
A6B 0463A D6890026 (02623)         SUBB(BR0,BW3,TF)               CR
A6C 0463C D889003A (02624)         ADDL(BR0,2,TF)                 CI
A6D 0463E DA890026 (02625)         SUBB(BR0,BW3,TF)               AI
                    (02626)
                    (02627) ; TEST IF NEW COSINE NEEDED, ELSE INPUT NEXT 4 POINTS
                    (02628) ;
A6E 04640 DC1976A6 (02629)         SUBB(BR1,BW3),JUMPP(CR4A5)
A6F 04642 DE30002B (02630)         SET(AF0)                       TELL APU COSINES COMING
```

```
                     (02631) ; TEST IF STAGE DONE, ELSE GET NEW COSINES
                     (02632)
A70 04644 F0215CB4 (02633)         SUBL(BW2,4),JUMPP(CR4A2)
A71 04646 F2300029 (02634)         SET(AF1)                      TELL APU STAGE DONE
                     (02635) ;********* CHANGE VALUE HERE TO STOP SHORT ***********
                     (02636) ;TO STOP SHORT 1 STAGE, BIND USIZE/4-1 HERE
A72 04648 F4500000 (02637) CR4A9S  LOAD(BR1,MSS)                 (FFTSIZE-1 BOUND)
A73 0464A F6890032 (02638)         SUBL(BR0,2,TF)                LAST DATA POINT
                     (02639)
                     (02640) ; TEST IF FFT DONE, ELSE START NEXT STAGE
                     (02641)
A74 0464C F8195BA6 (02642)         SUBB(BR1,BW3),JUMPP(CR4A1)    GO BACK
A75 0464E FA205971 (02643)         JUMP(CR4AE,RT),CLEAR          HALT APS INPUT
                     (02644)
A76 04650 FC890032 (02645) CR4A5   SUBL(BR0,2,TF)                AR
A77 04652 FE006760 (02646)         JUMP(CR4A4)                   BACK TO BUTTERFLY
                     (02647)
```

```
                        (02648) '          ANGULAR SEPARATION SUBROUTINE (INPUT - P1)
                        (02649) ; S1ANG=HP1/SS1
                        (02650) ; S2ANG=S1ANG/4
                        (02651) ; S3ANG=S2ANG/4
                        (02652) ; S4ANG=S3ANG/4
                        (02653) ; S5ANG=S4ANG/4
                        (02654) ; S6ANG=S5ANG/4
                        (02655) ; S7ANG=S6ANG/4
                        (02656)
                        (02657)
A78 04654 F0300030 (02658) ANGLE    SET(R0)
A79 04656 F23F0000 (02659) ANGL1$   ADD(BR3,M$S,C)                 [S1ANG BOUND]
A7A 04658 F43F0000 (02660) ANGL2$   ADD(BR3,M$S,C)                 [S2ANG BOUND]
A7B 0465A F63F0000 (02661) ANGL3$   ADD(BR3,M$S,C)                 [S3ANG BOUND]
A7C 0465C F83F0000 (02662) ANGL4$   ADD(BR3,M$S,C)                 [S4ANG BOUND]
A7D 0465E FA3F0000 (02663) ANGL5$   ADD(BR3,M$S,C)                 [S5ANG BOUND]
A7E 04660 FC3F0000 (02664) ANGL6$   ADD(BR3,M$S,C)                 [S6ANG BOUND]
A7F 04662 FE3F0000 (02665) ANGL7$   ADD(BR3,M$S,C)                 [S7ANG BOUND]
                        (02666) ;
          00000000 (02667)  CR4A$A=#C                             ASSIGN VALUE TO CHAIN
    04664               (02668)         END                        #A-1  END OF MODULE
                        (02669) ;
          00004664 (02670) CSM$1    #L = #L + 2*0
                        (02671) ;
          00000100 (02672)  CR4A$Z = #L - CSM$
                        (02673) ;
                        (02674) ;
```

```
                       (02675) *       VMOV
                       (02676) *
                       (02677) *       AP ROUTINES FOR VMOV
                       (02678) *
                       (02679) *
                       (02680) *
                       (02681) * APU3-VMOV
                       (02682) *
                       (02683) *       BINDS TO APS3-V1124
                       (02684) *
                       (02685) *       EQ.  Y=U
                       (02686) *
                       (02687)         EVEN                    START ON WORD BOUNDRY
    04664 0000         (02688)         DATA VMOVSSA            START ADDRESS
    04665 0009         (02689)         DATA VMOVSSZ            SIZE
                       (02690) *
                       (02691) VMOVS   BEGIN APU(VMOV)         START OF APU MODULE
          00000000     (02692) #A=0
                       (02693) *
A00 04666 08DC0000     (02694) VMOVSSA MOV(IQ,OQ)\NOP          DUMMY SCALAR 1 TO DUMMY OUT 1
A01 04668 08DC0000     (02695)         MOV(IQ,OQ)\NOP          DUMMY SCALAR 1 TO DUMMY OUT 2
A02 0466A 08FC0000     (02696)         MOV(IQA,OQ)\NOP         DUMMY SCALAR 1 TO DUMMY OUT 3
A03 0466C 08FC0000     (02697)         MOV(IQA,OQ)\NOP         DUMMY SCALAR 2 TO DUMMY OUT 4
                       (02698) *
          00000004     (02699) #1=#A
A04 0466E 08FC0000     (02700)         MOV(IQA,OQ)\NOP         LOOP TO MOVE U INTO Y
A05 04670 901C0004     (02701)         JUMPC(#1,FO)
A06 04672 20322032     (02702)         CLEAR(RA)               HALT
                       (02703) *
A07 04674 00000000     (02704)         NOP
A08 04676 10000000     (02705)         JUMP(VMOVSSA)           IF RESTART WITHOUT RELOAD
          00000009     (02706) VMOVSSZ=#A-VMOVSSA
    04678              (02707)         END
```

```
                  (02708) 'DEFINE TOP OF MODULE
                  (02709) *
         00004678 (02710) TOESCUR=#L                DEFINE TOP LOCATION OF MODULE
                  (02711) *
                  (02712) *
   04678          (02713)           END
```

DEFINE TOP OF MODULE

```
AFDTSORG:  008E8 (00027) (00165) (00684) (00701) (00706) (00711) (00716) (01724) (01728)
ANGL1S:    00079 (01637) (02659)
ANGL2S:    0007A (01640) (02660)
ANGL3S:    0007B (01643) (02661)
ANGL4S:    0007C (01646) (02662)
ANGL5S:    0007D (01649) (02663)
ANGL6S:    0007E (01652) (02664)
ANGL7S:    0007F (01655) (02665)
ANGLF:     00078 (02428) (02658)
APSASSS:   00245 (00028)
APSBNDR:   00FEA (00029)
APSBNDR0:  00F63 (00030) (01756)
APSBNDR1:  00F2D (00031)
APSBSL:    0024D (00032) (01622)
APSCSSC:   0024B (00033)
APSDONE:   00FB2 (00034)
APSG0:     0000C (00035)
APSG1:     0000D (00036)
APSPBFF:   00010 (00037)
APSSAID:   0000A (00038)
APSSSCLR:  0000F (00039)
APSSSS:    00009 (00040)
APSSBMO:   00004 (00041)
APSSNULL:  00000 (00169) (00189) (00193) (00197) (00201) (00221) (00225) (00229) (00233) (00253)
                 (00257) (00261) (00265) (00293) (00297) (00321) (00325) (00329) (00357) (00361)
                 (00381) (00385) (00413) (00417) (00421) (00425) (00445) (00449) (00453) (00457)
                 (00477) (00481) (00485) (00489) (00493) (00497) (00501) (00505) (00509) (00513)
                 (00517) (00521) (00525) (00529) (00533) (00537) (00541) (00545) (00549) (00553)
                 (00557) (00561) (00565) (00569) (00573) (00577) (00581) (00585) (00589) (00593)
                 (00597) (00601) (00605) (00609) (00613) (00617) (00621) (00625) (00629) (00633)
                 (00637) (00641) (00645) (00649) (00653) (00657) (00661) (00665) (00669) (00673)
                 (00677) (00681)
APSR:      1FFC0 (00042)
APUSNULL:  00000 (00168) (00188) (00192) (00196) (00200) (00212) (00220) (00224) (00228) (00232)
                 (00252) (00256) (00260) (00264) (00292) (00296) (00320) (00324) (00328) (00356)
                 (00360) (00380) (00384) (00412) (00416) (00420) (00424) (00444) (00448) (00452)
                 (00456) (00476) (00480) (00484) (00488) (00492) (00496) (00500) (00504) (00508)
                 (00512) (00516) (00520) (00524) (00528) (00532) (00536) (00540) (00544) (00548)
                 (00552) (00556) (00560) (00564) (00568) (00572) (00576) (00580) (00584) (00588)
                 (00592) (00596) (00600) (00604) (00608) (00612) (00616) (00620) (00624) (00628)
                 (00632) (00636) (00640) (00644) (00648) (00652) (00656) (00660) (00664) (00668)
                 (00672) (00676) (00680)
BCTSAD:    00604 (00044) (01378) (01534) (01603)
BCTSAT:    00686 (00045) (01373)
```

DEFINE TOP OF MODULE

```
  BCTSBA:     00582 (00046) (01598) (01669) (01685) (01707)
  BITSG0:     00000 (00047)
U C1120S:     00000 (00393)
U C1124AS:    00000 (00373)
U C1124BS:    00000 (00377)
U C2120S:     00000 (00389)
U C2124AS:    00000 (00365) (00369)
U CCVMULS:    00000 (00368)
  CLRSGOG1:   00792 (00049)
U CPOLARS:    00000 (00376)
  CR4SSZ:     0006D (01848) (02084)
  CR4ASA:     00000 (02350) (02667)
  CR4ASZ:     00100 (02349) (02672)
  CR4A1:      0005B (02589) (02642)
  CR4A1S:     00034 (01675) (02526) (02559) (02584)
  CR4A10S:    0003B (01708) (02541)
  CR4A11S:    0003C (01588) (02542)
  CR4A12S:    00046 (01564) (02557)
  CR4A13S:    00055 (01444) (02582)
  CR4A2:      0005C (02601) (02633)
  CR4A2S:     0004A (01522) (02562)
  CR4A3:      00065 (01523) (02599) (02613)
  CR4A3S:     00039 (01415) (02536)
  CR4A4:      00067 (02619) (02646)
  CR4A4S:     0005D (01599) (02604)
  CR4A5:      00076 (02629) (02645)
  CR4A5S:     00060 (01611) (02608)
  CR4A6S:     00062 (01612) (02610)
  CR4A7S:     00064 (01613) (02612)
  CR4A8S:     00066 (01416) (02614)
  CR4A9S:     00072 (01443) (02637)
  CR4AE:      00059 (02405) (02592) (02643)
  CR4AD1:     00031 (01625) (01629) (02519)
  CR4AD2:     00032 (02524) (02583)
  CR4AD3:     00049 (01413) (02537) (02561) (02578)
  CR4AD4:     0004B (02565) (02575)
  CR4ADF:     0003D (01575) (01577) (01579) (01582) (02544) (02558)
  CR4FB:      0003F (02013) (02052)
  CR4FC:      00038 (02003) (02053)
  CR4FE:      00053 (01999) (02044)
  CR4FS:      00028 (01886) (01978)
  CR4FSA:     00029 (01979) (02078)
  CR4ISSZ:    0006D (02108) (02330)
  CR4IB:      0003F (02259) (02298)
```

DEFINE TOP OF MODULE

```
CR4IC:     0003B (02249) (02299)
CR4IF:     00053 (02245) (02290)
CR4IS:     0002B (02133) (02224)
CR4ISA:    00029 (02225) (02324)
CSMS:      04564 (00703) (00708) (00713) (00718) (01413) (01414) (01415) (01416) (01443) (01444)
                 (01472) (01475) (01484) (01485) (01486) (01487) (01490) (01491) (01494) (01497)
                 (01500) (01503) (01506) (01509) (01522) (01523) (01526) (01564) (01575) (01577)
                 (01579) (01582) (01588) (01599) (01611) (01612) (01613) (01625) (01629) (01637)
                 (01640) (01643) (01646) (01649) (01652) (01655) (01670) (01675) (01686) (01708)
                 (01792) (01793) (01794) (01795) (01796) (02347) (02383) (02672)
CSMS1:     04664 (02346) (02670)
CSMSS:     00000 (02347) (02385)
CSM2S:     043A6 (00702) (00707) (01865)
CSM2SSA:   00000 (01847) (01868) (02082) (02084)
CSM2F:     00003 (01869) (01873)
CSM2L:     00002 (01871) (01881)
CSM4F:     0000D (01868) (01904)
CSM4FS:    0001B (01909) (01926)
CSM4I:     0000D (02115) (02150)
CSM4IS:    0001B (02155) (02172)
CSMF:      00006 (01793) (02389) (02394)
CSML:      00004 (01792) (02391) (02402)
CSML0S:    00002 (01414) (02388)
CSML1S:    00005 (01475) (02393)
CSML2S:    00008 (01794) (02396)
CSML3S:    00009 (01472) (02398)
CSML4S:    0000A (01795) (02399)
CSML5S:    0000D (01796) (02404)
CSML6S:    00001 (01686) (02387)
CSM0:      00025 (02385) (02461)
CSM01S:    00026 (01670) (02462)
CSM0F:     00029 (02463) (02471)
CSM0L:     00028 (01526) (02465) (02480)
CSPUSNOS:  021FC (00050) (00174) (00178) (00182) (00186) (00190) (00194) (00198) (00202) (00206)
                 (00210) (00214) (00218) (00222) (00226) (00230) (00234) (00238) (00242) (00246)
                 (00250) (00254) (00258) (00262) (00266) (00270) (00274) (00278) (00282) (00286)
                 (00290) (00294) (00298) (00302) (00306) (00310) (00314) (00318) (00322) (00326)
                 (00330) (00334) (00338) (00342) (00346) (00350) (00354) (00358) (00362) (00366)
                 (00370) (00374) (00378) (00382) (00386) (00390) (00394) (00402) (00406) (00410)
                 (00414) (00418) (00422) (00426) (00430) (00434) (00438) (00446) (00450) (00454)
                 (00458) (00462) (00466) (00470) (00474) (00478) (00482) (00486) (00490) (00510)
                 (00514) (00518) (00522) (00526) (00530) (00534) (00538) (00542) (00546) (00550)
                 (00554) (00558) (00562) (00566) (00570) (00574) (00578) (00582) (00586) (00590)
                 (00594) (00598) (00602) (00606) (00610) (00614) (00618) (00622) (00626) (00630)
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            DEFINE TOP OF MODULE

                      (00634) (00638) (00642) (00646) (00650) (00654) (00658) (00662) (00666) (00670)
                      (00674) (00678) (00682) (00687)
U CVMULS:     00000 (00364)
U CVRCPS:     00000 (00372)
U CXMULS:     00000 (00388)
U CXMULRS:    00000 (00392)
U D1113S:     00000 (00429) (00433)
U D1186S:     00000 (00437)
U D2116S:     00000 (00441)
U DCVMS:      00000 (00440)
U DDIFFS:     00000 (00428)
U DFIL22S:    00000 (00436)
U DINTGS:     00000 (00432)
  DMYS:       00794 (00052) (01037) (01038) (01039) (01040) (01131) (01132) (01133) (01134) (01234)
                    (01235) (01236) (01237)
  ERRORS:     01AFA (00054)
U F11AS:      00000 (00469)
U F11CS:      00000 (00461) (00473)
U F21BS:      00000 (00465)
U FEDSS:      00000 (00468)
  FEDSSDSP:   00AA4 (00468)
U FF3SSSM:    00000 (00494)
  FFTSCBSZ:   0079A (00056)
  FFTSSET:    04276 (00704) (00714) (01367)
  FFTNS:      000CC (00694) (00701)
  FFTNBS:     000CD (00695) (00706)
  FFTNIS:     000CE (00696) (00711)
  FFTNIBS:    000CF (00697) (00716)
  FLGSCLR:    00000 (00057)
  FLGSG0:     00004 (00058)
  FLGSG1:     00005 (00059) (01626) (01630)
  FLGSR1:     00011 (00060)
  FLGSSET:    00020 (00061) (01630)
U FRX4S:      00000 (00464)
  FRX4SDSP:   00A9F (00464)
U FSC4S:      00000 (00472)
  FSC4SDSP:   00AAA (00472)
U FSCRS:      00000 (00460)
  FSCRSDSP:   00A98 (00460)
  GSFLGS:     0439B (01626) (01630) (01751) (01789)
  HS:         00001 (00063) (01369) (01373) (01413) (01414) (01415) (01416) (01434) (01443) (01444)
                    (01472) (01475) (01484) (01485) (01486) (01487) (01490) (01491) (01494) (01497)
                    (01500) (01503) (01506) (01509) (01522) (01523) (01526) (01527) (01564) (01579)
                    (01582) (01588) (01589) (01611) (01612) (01613) (01625) (01626) (01629) (01630)
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                    (01637) (01640) (01643) (01646) (01649) (01652) (01655) (01662) (01681) (01703)
                    (01751)
   HUSDN:     042AA (01456) (01463)
   HUSLP:     0429F (01454) (01461)
   HUSTHL:    0439F (01453) (01792)
U  IFF3SSSM:  00000 (00498)
U  IRF3SSSM:  00000 (00506)
   ISM2S:     044B2 (00712) (00717) (02112)
   ISM2SSA:   00000 (02107) (02115) (02328) (02330)
   ISM2F:     00003 (02116) (02120)
   ISM2L:     00002 (02118) (02128)
   LOADSAP:   0187F (00065)
   LOADSAP1:  0188F (00066)
   MSS:       00000 (00070) (01009) (01010) (01012) (01013) (01042) (01043) (01104) (01105) (01107)
                    (01108) (01136) (01137) (01198) (01199) (01200) (01203) (01204) (01206) (01207)
                    (01239) (01240) (01790) (02387) (02388) (02391) (02393) (02394) (02396) (02398)
                    (02399) (02404) (02430) (02431) (02432) (02433) (02434) (02435) (02436) (02439)
                    (02443) (02448) (02452) (02455) (02462) (02465) (02519) (02526) (02536) (02541)
                    (02542) (02544) (02557) (02561) (02562) (02582) (02604) (02608) (02610) (02612)
                    (02613) (02614) (02637) (02659) (02660) (02661) (02662) (02663) (02664) (02665)
   MSKSLHYT:  0FF00 (00068) (01370) (01528) (01590) (01663) (01682) (01704)
   MSKSRBYT:  000FF (00069) (01435)
   PWR2S:     0439D (01374) (01623) (01790)
U  RF3SSSM:   00000 (00502)
   RPTFT04:   04276 (01369)
   RPTFT07:   04282 (01413)
   RPTFT08:   04299 (01447)
   RPTFT11:   042E4 (01564)
   RPTFT12:   042E7 (01566)
U  S0021S:    00000 (00173) (00177) (00181) (00185)
U  S1002S:    00000 (00345) (00349)
U  S1011S:    00000 (00333) (00337) (00341)
U  S2011S:    00000 (00353)
U  SADDS:     00000 (00172)
   SBMS1:     04333 (01624) (01629)
   SBMS2:     04338 (01628) (01633)
U  SBMSDCVM:  00000 (00442)
   SBMSFFT:   04352 (00709) (00719) (01661)
U  SBMSVPLY:  00000 (00398)
   SCRM:      0000F (02428) (02461)
   SCRM0:     00010 (01484) (02430) (02440) (02444) (02449) (02453) (02456)
   SCRM1S:    00011 (01490) (02431)
   SCRM10S:   00021 (01506) (02452)
   SCRM2S:    00012 (01485) (02432)
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DEFINE TOP OF MODULE

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   SCRM3S:     00013 (01494) (02433)
   SCRM4:      0001A (02438) (02442)
   SCRM4S:     00014 (01486) (02434)
   SCRM5:      0001D (02442) (02447)
   SCRM5S:     00015 (01491) (02435)
   SCRM6:      00020 (02447) (02451)
   SCRM6S:     00016 (01487) (02436)
   SCRM7:      00023 (01509) (02451) (02455)
   SCRM7S:     00018 (01497) (02439)
   SCRM8S:     00018 (01500) (02443)
   SCRM9S:     0001F (01503) (02448)
 U SDIVS:      00000 (00184)
 U SDOTS:      00000 (00352)
   SHFTLSR5:   007AF (00072)
   SMA1SSA:    00000 (00732) (00738) (00757)
   SMA1SSZ:    0000F (00733) (00757) (00759)
 U SMAXS:      00000 (00344)
 U SMAXABS:    00000 (00348)
 U SMULS:      00000 (00180)
 U SSUBS:      00000 (00176)
 U SSUMS:      00000 (00332)
 U SSUMABS:    00000 (00336)
 U SSUMSQS:    00000 (00340)
   START:      04000 (00096) (00722)
   SVTS:       003B2 (00073)
   SVTSUN1:    003CF (00074)
   SYSSFLGS:   1FFCE (00075)
   TEMSO:      007B4 (00077)
   TOFS:       021FF (00078)
   TOFSCUR:    04678 (00090) (02710)
   TOFSPTR:    0028B (00079) (00088)
   V1124S:     04122 (00237) (00249) (00269) (00273) (00277) (00301) (00305) (00309) (00317) (00401)
                     (00686) (00993) (01000) (01075)
   V1124S0:    00023 (01055) (01060)
   V1124S3:    00012 (01006) (01036)
   V1124S5:    0000C (01014) (01023)
   V1124S7:    00010 (01025) (01030)
   V1124S8:    0001F (01044) (01053)
   V1124SA:    04164 (00996) (01064)
   V1124SI:    0416C (00992) (01072)
   V1124SS:    00002 (00993) (01009)
   V1124SZ:    00062 (00995) (01075)
   V1124AS:    0418C (00205) (01089) (01096) (01170)
   V1124AS0:   00023 (01150) (01155)
```

DEFINE TOP OF MODULE

```
  V1124A$3:  00012 (01101) (01130)
  V1124A$5:  0000C (01109) (01118)
  V1124A$7:  00010 (01120) (01125)
  V1124A$8:  0001F (01138) (01148)
  V1124A$A:  041CF (01092) (01160)
  V1124A$I:  041F6 (01088) (01167)
  V1124A$S:  00002 (01089) (01104)
  V1124A$Z:  00062 (01091) (01170)
U V1124B$:   00000 (00209)
U V1124C$:   00000 (00213)
U V1124D$:   00000 (00217)
U V2116A$:   00000 (00397)
U V2124A$:   00000 (00289)
U V2134A$:   00000 (00241) (00245) (00281) (00285) (00313)
  V2134B$:   041F6 (00405) (01182) (01189) (01274)
  V2134B$0:  0002F (01253) (01258)
  V2134B$3:  0001D (01195) (01233)
  V2134B$8:  0002A (01241) (01251)
  V2134B$A:  0424F (01185) (01263)
  V2134B$I:  04256 (01181) (01271)
  V2134B$S:  00002 (01182) (01198)
  V2134B$Z:  00080 (01184) (01274)
U V3112A$:   00000 (00409)
  VCS2:      00009 (00786) (00793) (00796)
  VCS3:      00013 (00813) (00817)
  VCS4:      00017 (00814) (00821) (00823)
  VCS5:      0001A (00827)
  VCS6:      0001D (00838) (00918)
  VCS7:      00061 (00866) (00922)
  VCS8:      0000F (00802) (00804)
U VCLIP$:    00000 (00300)
U VCOMP$:    00000 (00312)
  VCOS$:     04020 (00404) (00771)
  VCOS$SA:   00000 (00768) (00777) (00927)
  VCOS$SZ:   00065 (00769) (00927) (00929)
  VCOSC$:    040FA (00934) (01217)
U VFIX$:     00000 (00208) (00216)
  VFLT$:     040F6 (00204) (00952)
  VFLT$SA:   00000 (00949) (00955) (00978)
  VFLT$SZ:   00012 (00950) (00978) (00980)
U VLIMIT$:   00000 (00308)
U VLOG16$:   00000 (00288)
U VMAG$:     00000 (00284)
U VMAGSQ$:   00000 (00280)
```

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                DEFINE TOP OF MODULE

  VMOVS:      04666 (00685) (02691)
  VMOVSSA:    00000 (02688) (02694) (02705) (02706)
  VMOVSSZ:    00009 (02689) (02706)
U VMULS:      00000 (00244)
U VPOLYS:     00000 (00396)
U VPOWS:      00000 (00408)
U VRAMPS:     00000 (00400)
U VRCPS:      00000 (00248)
U VSABS:      00000 (00268)
U VSABSQS:    00000 (00272)
  VSMA1S:     04002 (00236) (00735)
U VSMA2S:     00000 (00240)
U VSQS:       00000 (00276)
U VTAGS:      00000 (00316)
U VTHRSHS:    00000 (00304)
  WS:         00002 (00081) (00701) (00706) (00711) (00716) (01413) (01414) (01415) (01416) (01443)
                    (01444) (01472) (01475) (01484) (01485) (01486) (01487) (01490) (01491) (01494)
                    (01497) (01500) (01503) (01506) (01509) (01522) (01523) (01526) (01564) (01575)
                    (01577) (01579) (01582) (01588) (01599) (01611) (01612) (01613) (01625) (01629)
                    (01637) (01640) (01643) (01646) (01649) (01652) (01655) (01670) (01675) (01686)
                    (01708) (01726) (01727) (01728) (01741) (01792) (01793) (01794) (01795) (01796)
  XX1S:       0428F (01437) (01441)
  XX2S:       04294 (01438) (01443)
  YSPSZ:      04306 (01578) (01582)
  YSPSZ4:     0430A (01581) (01588)
  ZERO:       0078A (00083)

LINES WITH ERRORS:   84  (MAP VERSION 800101.10)   E-  506
```

T A B L E   O F   C O N T E N T S

T A B L E   O F   C O N T E N T S

```
          (00001) *   SNAP-II IOS PACKAGE  ---- APR 18, 1980 ----  PROGRAM # 840001.01A
          (00002) *
          (00003) *
          (00004) *   RELEASE 0.0  -- FIRST DELIVERED VERSION
          (00005) *
          (00006) *   RELEASE 1.0A
          (00007) *   1. CORRECTED READ SCROLL REGISTERS FCB. PR #4000 11/20/79
          (00008) *   2. CORRECTED SPECIAL BINDING MODULE FOR ADMRBS. PR #4001 11/20/79
          (00009) *   3. PR #4002 NOT INCLUDED, ONLY FOR REV 12 CSPU, MUST PATCH OBJECT FILE.
          (00010) *   4. FIXED START ADDRESSES FOR IOS-3, PR #4003 11/20/79.
          (00011) *   5. ADDED IOS-4 SUPPORT, PR #4008 2/13/80
          (00012) *
          (00013) *
          (00014) *
          (00015) *
          (00016) *   DEFINE SYMBOLS FOR SNAP-II EXECUTIVE REL. 3.05   5/22/79
          (00017) *
          (00018) *
000000E5  (00019) ADMRBFCB = 229                          ROTATE BUFFER FCB #
000008F8  (00020) AFDTSORG = $8F8                         AP DISPATCH TABLE ORIGIN
00000EFA  (00021) APSBNDR = $EFA                          AP BINDER ROUTINE
          (00022) *
00000604  (00023) BCTSAD = $604
00000686  (00024) BCTSAT = $686
00000582  (00025) BCTSBA = $582
00000040  (00026) BCTSSIZ = 64
0000000B  (00027) BITSBU = 11                             BUFFER UNDEFINED BIT
00000006  (00028) BITSIORD = 6
00000009  (00029) BITSIOWT = 9
          (00030) *
00000286  (00031) CSWSI161 = $286
00000322  (00032) CSWSIOS = $322
00000405  (00033) CSWSSIOB = $405
          (00034) *
00000014  (00035) ERRSIOS = 20
00001AFA  (00036) ERRORS = $1AFA
          (00037) *
000007F8  (00038) FDTS = $7F8
          (00039) *
00000001  (00040) HS = 1
          (00041) *
0000003F  (00042) IDEVS63 = $3F
00001B50  (00043) IDIVS = $1B50                           INTEGER DIVIDE ROUTINE
00000001  (00044) ILVLS1 = 1
```

```
         00000002 (00045) ILVLS2 = 2
         00000003 (00046) ILVLS3 = 3
         00000502 (00047) ISVTS = $502
         00000080 (00048) ISVTSSIZ = 128
                  (00049) *
         0000FF00 (00050) MSKSLBYT = $FF00
         000000FF (00051) MSKSRBYT = $00FF
         00000000 (00052) MSS = 0
                  (00053) *
         00001C12 (00054) SETSSMB = $1C12
         000008E8 (00055) SNAPSINL = $8E8
                  (00056) *
         000007B4 (00057) TEMS0 = $7B4                          TEMPORARY STORAGE
         000007B5 (00058) TEMS1 = $7B5
         000007B6 (00059) TEMS2 = $7B6
         00000288 (00060) TOESPTR = $288                        TOP OF EXEC POINTER
                  (00061) *
         00000002 (00062) WS = 2
                  (00063) *
                  (00064) *
                  (00065) *-----DEFINE START LOCATION FOR IOS PACKAGE
                  (00066) *
         00004900 (00067)          START = $4900                DEFINE START LOCATION
                  (00068) *
                  (00069) *
         00000288 (00070) *L = TOESPTR
                  (00071) *
    0028B 0010515A (00072)          ADDR     TOESCUR(,1)         UPDATE TOP OF EXEC POINTER
                  (00073) *
```

```
                    (00074) ! FCB DISPATCH TABLE FOR IOS ROUTINES
                    (00075) *
                    (00076) *
          0000086C  (00077) *L = FDTS + 2 * 66
                    (00078) *
0086C 00004B9C      (00079)  ADDR     LDSS                      66=LOAD IOS SCROLL
0086E 00004CE4      (00080)  ADDR     RNSS                      67=RUN IOS SCROLL
00870 00004D66      (00081)  ADDR     MPRAAS                    68=RUN ADAM AND AOM
                    (00082) *
          00000874  (00083) *L = FDTS + 2 * 70
                    (00084) *
00874 00004D9A      (00085)  ADDR     RSRS                      70=READ SCROLL REGISTERS
00876 00004DB2      (00086)  ADDR     WSRS                      71=WRITE SCROLL REGISTERS
                    (00087) *
          0000087A  (00088) *L = FDTS + 2 * 73
                    (00089) *
0087A 00004E32      (00090)  ADDR     ADAMSSSP                  73=SINGLE OR DUAL CHANNEL SAMPLING
0087C 00004F7C      (00091)  ADDR     ADAMS16S                  74=ADAM-16 ROUTINES
                    (00092) *
                    (00093) *
                    (00094) *
                    (00095) ! FCB DISPATCH TABLE ENTRY FOR ADMRB
                    (00096) *
          00000846  (00097)          *L = AFDTSORG + 6 *(ADMRBFCB - 128)
                    (00098) *
00846 001F5102      (00099)          ADDR ADMRBAPU (R7, 1)
00848 001F511E      (00100)          ADDR ADMRBAPS (R7, 1)
0084A 001050B0      (00101)          ADDR ADMRBS ( , 1, 0)
                    (00102) *
                    (00103) *
```

```
                (00104) * IOS INTERRUPT TABLES
                (00105) *
                (00106) *        SYSTEM STATEWORDS FOR IOS DEVICES
                (00107) *
                (00108) *
                (00109) *
       000002B6 (00110) #L = CSWSI161
                (00111) *
                (00112) *
002B6 49F21014 (00113)           CSW     CSWSSTDB,D16SINT1         IOS-2 DEVICE 16: LINE 1
002B8 4A001014 (00114) CSWSI162 CSW     CSWSSTDB,D16SINT2         IOS-2 DEVICE 16: LINE 2
002BA 4A0E1014 (00115) CSWSI163 CSW     CSWSSTDB,D16SINT3         IOS-2 DEVICE 16: LINE 3
002BC 4A161014 (00116) CSWSI171 CSW     CSWSSTDB,D17SINT1         IOS-2 DEVICE 17: LINE 1
002BE 4A241014 (00117) CSWSI172 CSW     CSWSSTDB,D17SINT2         IOS-2 DEVICE 17: LINE 2
002C0 4A321014 (00118) CSWSI173 CSW     CSWSSTDB,D17SINT3         IOS-2 DEVICE 17: LINE 3
002C2 4A3A1014 (00119) CSWSI181 CSW     CSWSSTDB,D18SINT1         IOS-2 DEVICE 18: LINE 1
002C4 4A481014 (00120) CSWSI182 CSW     CSWSSTDB,D18SINT2         IOS-2 DEVICE 18: LINE 2
002C6 4A561014 (00121) CSWSI183 CSW     CSWSSTDB,D18SINT3         IOS-2 DEVICE 18: LINE 3
002C8 4A5E1014 (00122) CSWSI191 CSW     CSWSSTDB,D19SINT1         IOS-2 DEVICE 19: LINE 1
002CA 4A6C1014 (00123) CSWSI192 CSW     CSWSSTDB,D19SINT2         IOS-2 DEVICE 19: LINE 2
002CC 4A7A1014 (00124) CSWSI193 CSW     CSWSSTDB,D19SINT3         IOS-2 DEVICE 19: LINE 3
002CE 4A821014 (00125) CSWSI201 CSW     CSWSSTDB,D20SINT1         IOS-2 DEVICE 20: LINE 1
002D0 4A901014 (00126) CSWSI202 CSW     CSWSSTDB,D20SINT2         IOS-2 DEVICE 20: LINE 2
002D2 4A9E1014 (00127) CSWSI203 CSW     CSWSSTDB,D20SINT3         IOS-2 DEVICE 20: LINE 3
002D4 4AA61014 (00128) CSWSI211 CSW     CSWSSTDB,D21SINT1         IOS-2 DEVICE 21: LINE 1
002D6 4AB41014 (00129) CSWSI212 CSW     CSWSSTDB,D21SINT2         IOS-2 DEVICE 21: LINE 2
002D8 1AC21014 (00130) CSWSI213 CSW     CSWSSTDB,D21SINT3         IOS-2 DEVICE 21: LINE 3
002DA 4ACA1014 (00131) CSWSI221 CSW     CSWSSTDB,D22SINT1         IOS-2 DEVICE 22: LINE 1
002DC 4AD81014 (00132) CSWSI222 CSW     CSWSSTDB,D22SINT2         IOS-2 DEVICE 22: LINE 2
002DE 4AE61014 (00133) CSWSI223 CSW     CSWSSTDB,D22SINT3         IOS-2 DEVICE 22: LINE 3
002E0 4AEE1014 (00134) CSWSI231 CSW     CSWSSTDB,D23SINT1         IOS-2 DEVICE 23: LINE 1
002E2 4AFC1014 (00135) CSWSI232 CSW     CSWSSTDB,D23SINT2         IOS-2 DEVICE 23: LINE 2
002E4 4B0A1014 (00136) CSWSI233 CSW     CSWSSTDB,D23SINT3         IOS-2 DEVICE 23: LINE 3
                (00137) *
                (00138) *
                (00139) *
                (00140)           EJECT
```

```
                   (00141) *
                   (00142) *         INITIAL VALUES FOR SYSTEM STATEWORDS FOR IOS DEVICES
                   (00143) *
                   (00144) *
          00000322 (00145) #L = CSW$IOS
                   (00146) *
                   (00147) *
00322 49E21014 (00148)          CSW      CSW$STDB,D16$INT1          IOS-2 DEVICE 16: LINE 1
00324 4A001014 (00149)          CSW      CSW$STDB,D16$INT2          IOS-2 DEVICE 16: LINE 2
00326 4A0E1014 (00150)          CSW      CSW$STDB,D16$INT3          IOS-2 DEVICE 16: LINE 3
00328 4A161014 (00151)          CSW      CSW$STDB,D17$INT1          IOS-2 DEVICE 17: LINE 1
0032A 4A241014 (00152)          CSW      CSW$STDB,D17$INT2          IOS-2 DEVICE 17: LINE 2
0032C 4A321014 (00153)          CSW      CSW$STDB,D17$INT3          IOS-2 DEVICE 17: LINE 3
0032E 4A3A1014 (00154)          CSW      CSW$STDB,D18$INT1          IOS-2 DEVICE 18: LINE 1
00330 4A481014 (00155)          CSW      CSW$STDB,D18$INT2          IOS-2 DEVICE 18: LINE 2
00332 4A561014 (00156)          CSW      CSW$STDB,D18$INT3          IOS-2 DEVICE 18: LINE 3
00334 4A5E1014 (00157)          CSW      CSW$STDB,D19$INT1          IOS-2 DEVICE 19: LINE 1
00336 4A6C1014 (00158)          CSW      CSW$STDB,D19$INT2          IOS-2 DEVICE 19: LINE 2
00338 4A7A1014 (00159)          CSW      CSW$STDB,D19$INT3          IOS-2 DEVICE 19: LINE 3
0033A 4A821014 (00160)          CSW      CSW$STDB,D20$INT1          IOS-2 DEVICE 20: LINE 1
0033C 4A901014 (00161)          CSW      CSW$STDB,D20$INT2          IOS-2 DEVICE 20: LINE 2
0033E 4A9E1014 (00162)          CSW      CSW$STDB,D20$INT3          IOS-2 DEVICE 20: LINE 3
00340 4AA61014 (00163)          CSW      CSW$STDB,D21$INT1          IOS-2 DEVICE 21: LINE 1
00342 4AB41014 (00164)          CSW      CSW$STDB,D21$INT2          IOS-2 DEVICE 21: LINE 2
00344 4AC21014 (00165)          CSW      CSW$STDB,D21$INT3          IOS-2 DEVICE 21: LINE 3
00346 4ACA1014 (00166)          CSW      CSW$STDB,D22$INT1          IOS-2 DEVICE 22: LINE 1
00348 4AD81014 (00167)          CSW      CSW$STDB,D22$INT2          IOS-2 DEVICE 22: LINE 2
0034A 4AE61014 (00168)          CSW      CSW$STDB,D22$INT3          IOS-2 DEVICE 22: LINE 3
0034C 4AEE1014 (00169)          CSW      CSW$STDB,D23$INT1          IOS-2 DEVICE 23: LINE 1
0034E 4AFC1014 (00170)          CSW      CSW$STDB,D23$INT2          IOS-2 DEVICE 23: LINE 2
00350 4B0A1014 (00171)          CSW      CSW$STDB,D23$INT3          IOS-2 DEVICE 23: LINE 3
                   (00172) *
                   (00173) *
                   (00174) *
                   (00175) *
                   (00176) *  INITIALIZE IOS BUSY FLAGS
                   (00177) *  ENTERED FROM SNAP-II SCHEDULER
                   (00178) *
          00000BEE (00179) #L = SNAPSINL + 6                       SET PC TO ENTRY IN SCHEDULER
                   (00180) *
00BEE 800049E1 (00181)          JMP      IOS$INL
                   (00182) *
                   (00183) *
                   (00184) *
```

```
00004900 (00185) *L = START                         RESET START LOCATION FOR MODULE
         (00186) *
         (00187) *
```

```
                 (00188) *      LOAD SCROLL ERROR CODES
                 (00189) *
                 (00190) *
                 (00191) *
                 (00192) *          #       ERROR MEANING
                 (00193) *         ---      -------------
                 (00194) *
                 (00195) *
                 (00196) *          1       TRANSFER DIRECTION ILLEGAL
                 (00197) *          2       BID 0 ILLEGAL ( OUT OF RANGE OR UNDEFINED )
                 (00198) *          3       BID 1 ILLEGAL ( OUT OF RANGE OR UNDEFINED )
                 (00199) *          4       BID 2 ILLEGAL ( OUT OF RANGE OR UNDEFINED )
                 (00200) *          5       BID 3 ILLEGAL ( OUT OF RANGE OR UNDEFINED )
                 (00201) *          6       SIZE(BID 0)  .NE. INTEGRAL MULTIPLE OF # CHANNELS
                 (00202) *          7       IF DOUBLE BUFFERED MODE, AND SIZE(BID 0) .NE. SIZE(BID 2)
                 (00203) *          8       1ST REGISTER # TO WRITE IS OUT OF RANGE
                 (00204) *          9       # REGISTERS TO WRITE IS OUT OF RANGE
                 (00205) *         10       INTEGER SCALAR ID OF OFFSET .GT. MAXIMUM INTEGER ID
                 (00206) *         11       BINDING CHAIN IN ERROR
                 (00207) *
                 (00208) *
                 (00209) *
049D0 0000       (00210) ERRSVAL  DATA      0                    SCROLL ERROR INDICATOR
                 (00211) *
                 (00212) *                                       BUSY FLAG PER IOS DEVICE
049D1 0000       (00213) IOSSFLG  DATA      0,0,0,0,0,0,0,0      0 => FREE, 1 => BUSY
049D2 0000
049D3 0000
049D4 0000
049D5 0000
049D6 0000
049D7 0000
049D8 0000
049D9 0000       (00214) ACQSLIST DATA      0,0,0,0,0,0,0,0      ACQUISITION MODE PER IOS DEVICE
049DA 0000
049DB 0000
049DC 0000
049DD 0000
049DE 0000
049DF 0000
049E0 0000
                 (00215) *
                 (00216)           EJECT
```

```
                   (00217) *
                   (00218) *  INITIALIZE IOS BUSY FLAGS
                   (00219) *
049E1 86001C12 (00220) IOS$INL  CALL    R0, SET$SMB        REPLACE INSTRUCTION IN SCHEDULER
                   (00221) *
049E3 1E200007 (00222)          LDRPT   R2, 7              SET TO CLEAR 8 WORDS
049E5 CC0449D1 (00223)          MOVZM   IOS$FLG(R2)
                   (00224) *
049E7 80000BE0 (00225)          JMP     SNAP$INL+8         RETURN TO SCHEDULER
                   (00226) *
049E9 0800     (00227)          EVEN
```

```
                   (00228) * IOS WAIT ROUTINE
                   (00229) *
                   (00230) *
                   (00231) *  ENTERED WITH R7 = SCROLL ID
                   (00232) *
                   (00233) *
049EA DC0E49C1     (00234) WAITSIOS SMBS    0, IOS$FLG-16(R7)    IF IOS FREE,
049EC 0F70         (00235)          RETURN                       RETURN
                   (00236) *
049ED 0190003F     (00237) WAITS0   WAITS   IDEVS63, ILVLS1      IF BUSY, WAIT FOR I/O DONE
                   (00238) *
049EF 2106         (00239)          HOP     WAITSIOS             REPEAT TEST
                   (00240) *
049F0 0F70         (00241)          RETURN
049F1 0800         (00242)          EVEN
```

```
                   (00243) !      INTERRUPT ROUTINES FOR IOS-SCROLL BUFFER MANAGEMENT
                   (00244) *
                   (00245) *
                   (00246) !           DEVICE NUMBER 16 - LINE 1
                   (00247) *
049F2 90700000 (00248) D16SINT1 MOVIR    R7, 0              POINT TO VALUES FOR FIRST INTERRUPT
049F4 86004812 (00249)          CALL     R0, IOSSINT        GO TO INTERRUPT PROCESSING SUBROUTINE
049F6 0F70     (00250)          RET
049F7 0800     (00251)          EVEN
049F8 90700001 (00252)          MOVIR    R7, 1              POINT TO VALUES FOR SECOND INTERRUPT
049FA 86004812 (00253)          CALL     R0, IOSSINT        GO TO INTERRUPT PROCESSING SUBROUTINE
049FC 0F70     (00254)          RET
049FD 0800     (00255)          EVEN
049FF 800049F2 (00256)          JMP      D16SINT1           REPEAT LOOP ON NEXT INTERRUPT
                   (00257) *
                   (00258) *
                   (00259) !           DEVICE NUMBER 16 - LINE 2
                   (00260) *
                   (00261) *
04A00 90700010 (00262) D16SINT2 MOVIR    R7, 16             POINT TO VALUES FOR FIRST INTERRUPT
04A02 86004812 (00263)          CALL     R0, IOSSINT        GO TO INTERRUPT PROCESSING SUBROUTINE
04A04 0F70     (00264)          RET
04A05 0800     (00265)          EVEN
04A06 90700011 (00266)          MOVIR    R7, 17             POINT TO VALUES FOR SECOND INTERRUPT
04A08 86004812 (00267)          CALL     R0, IOSSINT        GO TO INTERRUPT PROCESSING SUBROUTINE
04A0A 0F70     (00268)          RET
04A0B 0800     (00269)          EVEN
04A0C 80004A00 (00270)          JMP      D16SINT2           REPEAT LOOP ON NEXT INTERRUPT
                   (00271) *
                   (00272) *
                   (00273) !           DEVICE NUMBER 16 - LINE 3
                   (00274) *
                   (00275) *
04A0F 90700000 (00276) D16SINT3 MOVIR    R7, 0              POINT TO VALUES FOR INTERRUPT 16
04A10 86004824 (00277)          CALL     R0, IOSSINTC       GO TO INTERRUPT COMPLETION SUBROUTINE
04A12 0F70     (00278)          RET
04A13 0800     (00279)          EVEN
04A14 80004A0F (00280)          JMP      D16SINT3
                   (00281) *
                   (00282)          EJECT
```

```
                   (00283) !            DEVICE NUMBER 17 - LINE 1
                   (00284) *
04A16 90700002 (00285) D17SINT1 MOVIR   R7, 2               POINT TO VALUES FOR FIRST INTERRUPT
04A18 86004812 (00286)          CALL    R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04A1A 0F70     (00287)          RET
04A1B 0800     (00288)          EVEN
04A1C 90700003 (00289)          MOVIR   R7, 3               POINT TO VALUES FOR SECOND INTERRUPT
04A1E 86004812 (00290)          CALL    R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04A20 0F70     (00291)          RET
04A21 0800     (00292)          EVEN
04A22 80004A16 (00293)          JMP     D17SINT1            REPEAT LOOP ON NEXT INTERRUPT
               (00294) *
               (00295) *
               (00296) !            DEVICE NUMBER 17 - LINE 2
               (00297) *
               (00298) *
04A24 90700012 (00299) D17SINT2 MOVIR   R7, 18              POINT TO VALUES FOR FIRST INTERRUPT
04A26 86004812 (00300)          CALL    R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04A28 0F70     (00301)          RET
04A29 0800     (00302)          EVEN
04A2A 90700013 (00303)          MOVIR   R7, 19              POINT TO VALUES FOR SECOND INTERRUPT
04A2C 86004812 (00304)          CALL    R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04A2E 0F70     (00305)          RET
04A2F 0800     (00306)          EVEN
04A30 80004A24 (00307)          JMP     D17SINT2            REPEAT LOOP ON NEXT INTERRUPT
               (00308) *
               (00309) *
               (00310) !            DEVICE NUMBER 17 - LINE 3
               (00311) *
               (00312) *
04A32 90700002 (00313) D17SINT3 MOVIR   R7, 2               POINT TO VALUES FOR INTERRUPT 17
04A34 86004824 (00314)          CALL    R0, IOSSINTC        GO TO INTERRUPT COMPLETION SUBROUTINE
04A36 0F70     (00315)          RET
04A37 0800     (00316)          EVEN
04A38 80004A32 (00317)          JMP     D17SINT3
               (00318) *
               (00319)          EJECT
```

```
                  (00320) !           DEVICE NUMBER 18 - LINE 1
                  (00321) *
04A3A 90700004 (00322) D18$INT1 MOVIR    R7, 4              POINT TO VALUES FOR FIRST INTERRUPT
04A3C 86004B12 (00323)          CALL     R0, IOS$INT        GO TO INTERRUPT PROCESSING SUBROUTINE
04A3E 0F70     (00324)          RET
04A3F 0800     (00325)          EVEN
04A40 90700005 (00326)          MOVIR    R7, 5              POINT TO VALUES FOR SECOND INTERRUPT
04A42 86004B12 (00327)          CALL     R0, IOS$INT        GO TO INTERRUPT PROCESSING SUBROUTINE
04A44 0F70     (00328)          RET
04A45 0800     (00329)          EVEN
04A46 80004A3A (00330)          JMP      D18$INT1           REPEAT LOOP ON NEXT INTERRUPT
                  (00331) *
                  (00332) *
                  (00333) !           DEVICE NUMBER 18 - LINE 2
                  (00334) *
                  (00335) *
04A48 90700014 (00336) D18$INT2 MOVIR    R7, 20             POINT TO VALUES FOR FIRST INTERRUPT
04A4A 86004B12 (00337)          CALL     R0, IOS$INT        GO TO INTERRUPT PROCESSING SUBROUTINE
04A4C 0F70     (00338)          RET
04A4D 0800     (00339)          EVEN
04A4E 90700015 (00340)          MOVIR    R7, 21             POINT TO VALUES FOR SECOND INTERRUPT
04A50 86004B12 (00341)          CALL     R0, IOS$INT        GO TO INTERRUPT PROCESSING SUBROUTINE
04A52 0F70     (00342)          RET
04A53 0800     (00343)          EVEN
04A54 80004A48 (00344)          JMP      D18$INT2           REPEAT LOOP ON NEXT INTERRUPT
                  (00345) *
                  (00346) *
                  (00347) !           DEVICE NUMBER 18 - LINE 3
                  (00348) *
                  (00349) *
04A56 90700004 (00350) D18$INT3 MOVIR    R7, 4              POINT TO VALUES FOR INTERRUPT 18
04A58 86004B24 (00351)          CALL     R0, IOS$INTC       GO TO INTERRUPT COMPLETION SUBROUTINE
04A5A 0F70     (00352)          RET
04A5B 0800     (00353)          EVEN
04A5C 80004A56 (00354)          JMP      D18$INT3
                  (00355) *
                  (00356)          EJECT
```

```
                    (00357) !            DEVICE NUMBER 19 - LINE 1
                    (00358) *
04A5E 90700006 (00359) D19SINT1 MOVIR    R7, 6          POINT TO VALUES FOR FIRST INTERRUPT
04A60 86004812 (00360)          CALL     R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A62 0F70     (00361)          RET
04A63 0800     (00362)          EVEN
04A64 90700007 (00363)          MOVIR    R7, 7          POINT TO VALUES FOR SECOND INTERRUPT
04A66 86004812 (00364)          CALL     R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A68 0F70     (00365)          RET
04A69 0800     (00366)          EVEN
04A6A 80004A5E (00367)          JMP      D19SINT1       REPEAT LOOP ON NEXT INTERRUPT
               (00368) *
               (00369) *
               (00370) !            DEVICE NUMBER 19 - LINE 2
               (00371) *
               (00372) *
04A6C 90700016 (00373) D19SINT2 MOVIR    R7, 22         POINT TO VALUES FOR FIRST INTERRUPT
04A6E 86004812 (00374)          CALL     R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A70 0F70     (00375)          RET
04A71 0800     (00376)          EVEN
04A72 90700017 (00377)          MOVIR    R7, 23         POINT TO VALUES FOR SECOND INTERRUPT
04A74 86004812 (00378)          CALL     R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A76 0F70     (00379)          RET
04A77 0800     (00380)          EVEN
04A78 80004A6C (00381)          JMP      D19SINT2       REPEAT LOOP ON NEXT INTERRUPT
               (00382) *
               (00383) *
               (00384) !            DEVICE NUMBER 19 - LINE 3
               (00385) *
               (00386) *
04A7A 90700006 (00387) D19SINT3 MOVIR    R7, 6          POINT TO VALUES FOR INTERRUPT 16
04A7C 86004824 (00388)          CALL     R0, IOSSINTC   GO TO INTERRUPT COMPLETION SUBROUTINE
04A7E 0F70     (00389)          RET
04A7F 0800     (00390)          EVEN
04A80 80004A7A (00391)          JMP      D19SINT3
               (00392) *
               (00393)          EJECT
```

```
                    (00394) !          DEVICE NUMBER 20 - LINE 1
                    (00395) *
04A82 90700008      (00396) D20$INT1 MOVIR   R7, 8          POINT TO VALUES FOR FIRST INTERRUPT
04A84 86004B12      (00397)          CALL    R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A86 0F70          (00398)          RET
04A87 0800          (00399)          EVEN
04A88 90700009      (00400)          MOVIR   R7, 9          POINT TO VALUES FOR SECOND INTERRUPT
04A8A 86004B12      (00401)          CALL    R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A8C 0F70          (00402)          RET
04A8D 0800          (00403)          EVEN
04A8E 80004A82      (00404)          JMP     D20$INT1       REPEAT LOOP ON NEXT INTERRUPT
                    (00405) *
                    (00406) *
                    (00407) !          DEVICE NUMBER 20 - LINE 2
                    (00408) *
                    (00409) *
04A90 90700018      (00410) D20$INT2 MOVIR   R7, 24         POINT TO VALUES FOR FIRST INTERRUPT
04A92 86004B12      (00411)          CALL    R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A94 0F70          (00412)          RET
04A95 0800          (00413)          EVEN
04A96 90700019      (00414)          MOVIR   R7, 25         POINT TO VALUES FOR SECOND INTERRUPT
04A98 86004B12      (00415)          CALL    R0, IOSSINT    GO TO INTERRUPT PROCESSING SUBROUTINE
04A9A 0F70          (00416)          RET
04A9B 0800          (00417)          EVEN
04A9C 80004A90      (00418)          JMP     D20$INT2       REPEAT LOOP ON NEXT INTERRUPT
                    (00419) *
                    (00420) *
                    (00421) !          DEVICE NUMBER 20 - LINE 3
                    (00422) *
                    (00423) *
04A9E 90700008      (00424) D20$INT3 MOVIR   R7, 8          POINT TO VALUES FOR INTERRUPT 20
04AA0 86004B24      (00425)          CALL    R0, IOSSINTC   GO TO INTERRUPT COMPLETION SUBROUTINE
04AA2 0F70          (00426)          RET
04AA3 0800          (00427)          EVEN
04AA4 80004A9E      (00428)          JMP     D20$INT3
                    (00429) *
                    (00430)          EJECT
```

```
                  (00431) !           DEVICE NUMBER 21 - LINE 1
                  (00432) *
04AA6 9070000A    (00433) D21SINT1 MOVIR    R7, 10              POINT TO VALUES FOR FIRST INTERRUPT
04AA8 86004B12    (00434)          CALL     R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04AAA 0F70        (00435)          RET
04AAB 0800        (00436)          EVEN
04AAC 9070000B    (00437)          MOVIR    R7, 11              POINT TO VALUES FOR SECOND INTERRUPT
04AAE 86004B12    (00438)          CALL     R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04AB0 0F70        (00439)          RET
04AB1 0800        (00440)          EVEN
04AB2 80004AA6    (00441)          JMP      D21SINT1            REPEAT LOOP ON NEXT INTERRUPT
                  (00442) *
                  (00443) *
                  (00444) !           DEVICE NUMBER 21 - LINE 2
                  (00445) *
                  (00446) *
04AB4 9070001A    (00447) D21SINT2 MOVIR    R7, 26              POINT TO VALUES FOR FIRST INTERRUPT
04AB6 86004B12    (00448)          CALL     R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04AB8 0F70        (00449)          RET
04AB9 0800        (00450)          EVEN
04ABA 9070001B    (00451)          MOVIR    R7, 27              POINT TO VALUES FOR SECOND INTERRUPT
04ABC 86004B12    (00452)          CALL     R0, IOSSINT         GO TO INTERRUPT PROCESSING SUBROUTINE
04ABE 0F70        (00453)          RET
04ABF 0800        (00454)          EVEN
04AC0 80004AB4    (00455)          JMP      D21SINT2            REPEAT LOOP ON NEXT INTERRUPT
                  (00456) *
                  (00457) *
                  (00458) !           DEVICE NUMBER 21 - LINE 3
                  (00459) *
                  (00460) *
04AC2 9070000A    (00461) D21SINT3 MOVIR    R7, 10              POINT TO VALUES FOR INTERRUPT 21
04AC4 86004B24    (00462)          CALL     R0, IOSSINTC        GO TO INTERRUPT COMPLETION SUBROUTINE
04AC6 0F70        (00463)          RET
04AC7 0800        (00464)          EVEN
04AC8 80004AC2    (00465)          JMP      D21SINT3
                  (00466) *
                  (00467)          EJECT
```

INTERRUPT ROUTINES FOR IOS-SCROLL BUFFER MANAGEMENT

```
                    (00468) !            DEVICE NUMBER 22 - LINE 1
                    (00469) *
04ACA 9070000C (00470) D22$INT1 MOVIR    R7, 12            POINT TO VALUES FOR FIRST INTERRUPT
04ACC 86004812 (00471)          CALL     R0, IOS$INT       GO TO INTERRUPT PROCESSING SUBROUTINE
04ACE 0E70     (00472)          RET
04ACF 0800     (00473)          EVEN
04AD0 9070000D (00474)          MOVIR    R7, 13            POINT TO VALUES FOR SECOND INTERRUPT
04AD2 86004812 (00475)          CALL     R0, IOS$INT       GO TO INTERRUPT PROCESSING SUBROUTINE
04AD4 0E70     (00476)          RET
04AD5 0800     (00477)          EVEN
04AD6 80004ACA (00478)          JMP      D22$INT1          REPEAT LOOP ON NEXT INTERRUPT
               (00479) *
               (00480) *
               (00481) !            DEVICE NUMBER 22 - LINE 2
               (00482) *
               (00483) *
04AD8 9070001C (00484) D22$INT2 MOVIR    R7, 28            POINT TO VALUES FOR FIRST INTERRUPT
04ADA 86004812 (00485)          CALL     R0, IOS$INT       GO TO INTERRUPT PROCESSING SUBROUTINE
04ADC 0E70     (00486)          RET
04ADD 0800     (00487)          EVEN
04ADE 9070001D (00488)          MOVIR    R7, 29            POINT TO VALUES FOR SECOND INTERRUPT
04AE0 86004812 (00489)          CALL     R0, IOS$INT       GO TO INTERRUPT PROCESSING SUBROUTINE
04AE2 0E70     (00490)          RET
04AE3 0800     (00491)          EVEN
04AE4 80004AD8 (00492)          JMP      D22$INT2          REPEAT LOOP ON NEXT INTERRUPT
               (00493) *
               (00494) *
               (00495) !            DEVICE NUMBER 22 - LINE 3
               (00496) *
               (00497) *
04AE6 9070000C (00498) D22$INT3 MOVIR    R7, 12            POINT TO VALUES FOR INTERRUPT 22
04AE8 86004824 (00499)          CALL     R0, IOS$INTC      GO TO INTERRUPT COMPLETION SUBROUTINE
04AEA 0E70     (00500)          RET
04AEB 0800     (00501)          EVEN
04AEC 80004AE6 (00502)          JMP      D22$INT3
               (00503) *
               (00504)          EJECT
```

```
                   (00505) !           DEVICE NUMBER 23 - LINE 1
                   (00506) *
04AEE 9070000E (00507) D23$INT1 MOVIR   R7, 14          POINT TO VALUES FOR FIRST INTERRUPT
04AF0 86004B12 (00508)          CALL    R0, IOSSINT     GO TO INTERRUPT PROCESSING SUBROUTINE
04AF2 0E70     (00509)          RET
04AF3 0800     (00510)          EVEN
04AF4 9070000F (00511)          MOVIR   R7, 15          POINT TO VALUES FOR SECOND INTERRUPT
04AF6 86004B12 (00512)          CALL    R0, IOSSINT     GO TO INTERRUPT PROCESSING SUBROUTINE
04AF8 0E70     (00513)          RET
04AF9 0800     (00514)          EVEN
04AFA 80004AEE (00515)          JMP     D23$INT1        REPEAT LOOP ON NEXT INTERRUPT
               (00516) *
               (00517) *
               (00518) !           DEVICE NUMBER 23 - LINE 2
               (00519) *
               (00520) *
04AFC 9070001E (00521) D23$INT2 MOVIR   R7, 30          POINT TO VALUES FOR FIRST INTERRUPT
04AFE 86004B12 (00522)          CALL    R0, IOSSINT     GO TO INTERRUPT PROCESSING SUBROUTINE
04B00 0E70     (00523)          RET
04B01 0800     (00524)          EVEN
04B02 9070001F (00525)          MOVIR   R7, 31          POINT TO VALUES FOR SECOND INTERRUPT
04B04 86004B12 (00526)          CALL    R0, IOSSINT     GO TO INTERRUPT PROCESSING SUBROUTINE
04B06 0E70     (00527)          RET
04B07 0800     (00528)          EVEN
04B08 80004AFC (00529)          JMP     D23$INT2        REPEAT LOOP ON NEXT INTERRUPT
               (00530) *
               (00531) *
               (00532) !           DEVICE NUMBER 23 - LINE 3
               (00533) *
               (00534) *
04B0A 9070000E (00535) D23$INT3 MOVIR   R7, 14          POINT TO VALUES FOR INTERRUPT 23
04B0C 86004B24 (00536)          CALL    R0, IOSSINTC    GO TO INTERRUPT COMPLETION SUBROUTINE
04B0E 0E70     (00537)          RET
04B0F 0800     (00538)          EVEN
04B10 80004B0A (00539)          JMP     D23$INT3
               (00540) *
               (00541)          EJECT
```

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                  (00542) !      GENERAL SUBROUTINES TO PROCESS IOS INTERRUPTS
                  (00543) *
                  (00544) *
04B12 F05F4B4C    (00545) IOSSINT  MOVMR   R5, IOS$SRWI(R7)    GET READ/WRITE INDEX
04B14 406F        (00546)          MOVRR   R6, R7              COMPUTE LOGICAL BUFFER INDEX
04B15 3C61        (00547)          LRS     R6, 1
04B16 4C7C        (00548)          ADDRR   R7, R6
                  (00549) *
04B17 F06F4B6C    (00550)          MOVMR   R6, IOSLBI(R7)      IF BID LEGAL,
04B19 1A10        (00551)          SKPL    EQZ
04B1A 820A4B46    (00552)          XCT     IOS$MTBL+WS(R5)     FLAG CURRENT BUFFER AVAILABLE
                  (00553) *
04B1C F07F4B6D    (00554)          MOVMR   R7, IOSLBI+1(R7)    IF BID LEGAL,
04B1E 1A10        (00555)          SKPL    EQZ
04B1F 820A4B44    (00556)          XCT     IOS$MTBL(R5)        FLAG NEXT BUFFER BUSY
                  (00557) *
04B21 1200003F    (00558)          AINT    IOEVS63, ILVL$1     SIGNAL I/O OPERATION COMPLETE
04B23 0F70        (00559)          RETURN
                  (00560)          EVEN
                  (00561) *
                  (00562) *
                  (00563) *
04B24 402F        (00564) IOSSINTC MOVRR   R2, R7              SAVE INDEX FOR LATER USE
04B25 F05F4B4C    (00565)          MOVMR   R5, IOS$SRWI(R7)    GET READ/WRITE INDEX
04B27 406F        (00566)          MOVRR   R6, R7              COMPUTE INDEX TO LOGICAL BUFFERS ID'S
04B28 3C61        (00567)          LRS     R6, 1
04B29 4C7C        (00568)          ADDRR   R7, R6
                  (00569)          EVEN
04B2A C03F4B84    (00570)          MOVMRL  R3, IOSLBI+24(R7)   GET LOGICAL BUFFER IDS (1 AND 3)
04B2C C06F4B6C    (00571)          MOVMRL  R6, IOSLBI(R7)      GET LOGICAL BUFFER IDS (0 AND 2)
                  (00572) *
04B2E 0260        (00573)          TEST    R6                  IF BID LEGAL,
04B2F 1A10        (00574)          SKPL    EQZ
04B30 820A4B46    (00575)          XCT     IOS$MTBL+WS(R5)     FLAG BUFFER 0 AVAILABLE
                  (00576) *
04B32 406F        (00577)          MOVRR   R6, R7              IF BID LEGAL,
04B33 1A10        (00578)          SKPL    EQZ
04B34 820A4B46    (00579)          XCT     IOS$MTBL+WS(R5)     FLAG BUFFER 2 AVAILABLE
                  (00580) *
04B36 4066        (00581)          MOVRR   R6, R3              IF BID LEGAL,
04B37 1A10        (00582)          SKPL    EQZ
04B38 820A4B46    (00583)          XCT     IOS$MTBL+WS(R5)     FLAG BUFFER 1 AVAILABLE
                  (00584) *
04B3A 406B        (00585)          MOVRR   R6, R4              IF BID LEGAL,
```

```
04B3B 1A10      (00586)         SKPL     F0Z
04B3C 820A4B46  (00587)         XCT      IOSBMTBL+WS(R5)       FLAG BUFFER 3 AVAILABLE
                (00588) *
04B3E 3C21      (00589)         LRS      R2, 1
04B3F CC0449D1  (00590)         MOVZM    IOSSFLG(R2)           CLEAR IOS DEVICE BUSY FLAG
                (00591) *
04B41 1200003F  (00592)         AINT     IDEVS63, ILVLS1       SIGNAL I/O OPERATION COMPLETE
04B43 0F70      (00593)         RETURN
                (00594)         EVEN
                (00595) *
                (00596)         EJECT
```

```
                    (00597) * BUFFER CONTROL TABLE FOR I/O INTERRUPTS
                    (00598) *
                    (00599) *
04B44 D26F0686 (00600) IOSBMTBL SMB      BITSIORD, BCTSAT(R7) READ DEVICE
04B46 D06C0686 (00601)          CMB      BITSIORD, BCTSAT(R6)
04B48 D31F0686 (00602)          SMB      BITSIOWT, BCTSAT(R7) WRITE DEVICE
04B4A D11C0686 (00603)          CMB      BITSIOWT, BCTSAT(R6)
                    (00604) *
                    (00605) *
                    (00606) *  BIT/SET READ/WRITE INDEX FOR I/O INTERRUPTS
                    (00607) *
                    (00608) *  SET EACH HALFWORD TO 0 FOR READ, 4 FOR WRITE
                    (00609) *
                    (00610) *
                    (00611) *
04B4C 0000     (00612) IOSBSRWI DATA     0,0                  DEVICE 16 - LINE 1
04B4D 0000
04B4E 0000     (00613)          DATA     0,0                  DEVICE 17 - LINE 1
04B4F 0000
04B50 0000     (00614)          DATA     0,0                  DEVICE 18 - LINE 1
04B51 0000
04B52 0000     (00615)          DATA     0,0                  DEVICE 19 - LINE 1
04B53 0000
04B54 0000     (00616)          DATA     0,0                  DEVICE 20 - LINE 1
04B55 0000
04B56 0000     (00617)          DATA     0,0                  DEVICE 21 - LINE 1
04B57 0000
04B58 0000     (00618)          DATA     0,0                  DEVICE 22 - LINE 1
04B59 0000
04B5A 0000     (00619)          DATA     0,0                  DEVICE 23 - LINE 1
04B5B 0000
               (00620) *
04B5C 0000     (00621)          DATA     0,0                  DEVICE 16 - LINE 2
04B5D 0000
04B5E 0000     (00622)          DATA     0,0                  DEVICE 17 - LINE 2
04B5F 0000
04B60 0000     (00623)          DATA     0,0                  DEVICE 18 - LINE 2
04B61 0000
04B62 0000     (00624)          DATA     0,0                  DEVICE 19 - LINE 2
04B63 0000
04B64 0000     (00625)          DATA     0,0                  DEVICE 20 - LINE 2
04B65 0000
04B66 0000     (00626)          DATA     0,0                  DEVICE 21 - LINE 2
04B67 0000
```

```
04868 0000     (00627)          DATA     0,0               DEVICE 22 - LINE 2
04869 0000
0486A 0000     (00628)          DATA     0,0               DEVICE 23 - LINE 2
0486B 0000
               (00629) *
               (00630)          EJECT
```

```
                     (00631) *  LOGICAL BUFFER IOS # 2 FOR I/O INTERRUPTS
                     (00632) *
                     (00633) *
                     (00634) *  SET THE HALFWORD TRIPLET TO BUF0, BUF2, BUF0
                     (00635) *
                     (00636) *
04B6C 0000           (00637) IOSLB1   DATA      0,0,0               DEVICE 16 - LINE 1
04B6D 0000
04B6E 0000
04B6F 0000           (00638)          DATA      0,0,0               DEVICE 17 - LINE 1
04B70 0000
04B71 0000
04B72 0000           (00639)          DATA      0,0,0               DEVICE 18 - LINE 1
04B73 0000
04B74 0000
04B75 0000           (00640)          DATA      0,0,0               DEVICE 19 - LINE 1
04B76 0000
04B77 0000
04B78 0000           (00641)          DATA      0,0,0               DEVICE 20 - LINE 1
04B79 0000
04B7A 0000
04B7B 0000           (00642)          DATA      0,0,0               DEVICE 21 - LINE 1
04B7C 0000
04B7D 0000
04B7E 0000           (00643)          DATA      0,0,0               DEVICE 22 - LINE 1
04B7F 0000
04B80 0000
04B81 0000           (00644)          DATA      0,0,0               DEVICE 23 - LINE 1
04B82 0000
04B83 0000
                     (00645) *
                     (00646) *  SET THE HALFWORD TRIPLET TO BUF1, BUF3, BUF1
                     (00647) *
04B84 0000           (00648)          DATA      0,0,0               DEVICE 16 - LINE 2
04B85 0000
04B86 0000
04B87 0000           (00649)          DATA      0,0,0               DEVICE 17 - LINE 2
04B88 0000
04B89 0000
04B8A 0000           (00650)          DATA      0,0,0               DEVICE 18 - LINE 2
04B8B 0000
04B8C 0000
04B8D 0000           (00651)          DATA      0,0,0               DEVICE 19 - LINE 2
04B8E 0000
```

```
04B8F 0000
04B90 0000     (00652)      DATA    0,0,0          DEVICE 20 - LINE 2
04B91 0000
04B92 0000
04B93 0000     (00653)      DATA    0,0,0          DEVICE 21 - LINE 2
04B94 0000
04B95 0000
04B96 0000     (00654)      DATA    0,0,0          DEVICE 22 - LINE 2
04B97 0000
04B98 0000
04B99 0000     (00655)      DATA    0,0,0          DEVICE 23 - LINE 2
04B9A 0000
04B9B 0000
```

```
' LDSS      MODULE TO PROCESS THE LOAD IOS SCROLL FCB
*
*
*
*  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
*
*
*          !                         !                         !
*   WORD   !        LEFT BYTE        !       RIGHT BYTE        !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*    0     !   POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB) !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*    1     !           66            !          BID            !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*    2     !                   SCROLL IDENT                    !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*    3     !                   SCROLL TYPE                     !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*    4     !            0            !           0             !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*    5     !            0            !           0             !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*
*
*
*
           EJECT
```

```
!            LOGICAL BUFFER FORMAT FOR IOS PROGRAM
*
*
*       HW              CONTENTS
*       --              --------
*
*       0               N = SCROLL PROGRAM SIZE IN HALFWORDS
*
*       1               BID1      :      BID0
*
*       2 - N+1         SCROLL PROGRAM IN HALFWORDS
*
*       N+2             0 IF MAP -> SCROLL TRANSFER, ELSE 2 (ADAM=2, ADM=0)
*
*       N+3             # CHANNELS        :  ACQUISITION MODE
*
*       N+4             BID3      :      BID2
*
*       N+5             M = NUMBER OF SCROLL REGISTERS TO LOAD
*
*       N+6             # OF FIRST SCROLL REGISTER TO LOAD
*
*       N+7 - N+M+6     VALUES TO LOAD INTO SCROLL REGISTERS
*
*       N+M+7           INTEGER SCALAR ID OF OFFSET
*
*       N+M+8           BUFFER 0 CHAIN ANCHOR
*
*       N+M+9           BUFFER 1 CHAIN ANCHOR
*
*       N+M+10          BUFFER 2 CHAIN ANCHOR
*
*       N+M+11          BUFFER 3 CHAIN ANCHOR
*
*------------------------------------------------------------
*        ACQUISTION MODE:
*                                 0 => DISCRETE OR BURST
*                           .NE. 0 => CONTINUOUS
*                                          1 => DOUBLE BUFFERED
*                                          2 => CIRCULAR
*------------------------------------------------------------
              EJECT
```

```
                    (00738) *
                    (00739) *---  REGISTER USAGE
                    (00740) *
                    (00741) *          R1       POINTER TO FCB # IN FCB BLOCK
                    (00742) *          R2       SCROLL PROGRAM SIZE = N
                    (00743) *          R3       BA = IOS LOGICAL BUFFER BASE ADDRESS
                    (00744) *          R4       SCROLL INDEX   ( 16 => 0, 17 => 2, ... , 23 => 14 )
                    (00745) *
                    (00746) *---
                    (00747) *
04B9C 707200FF (00748) LDSS     MOVWK    R7, R1, MSKSRBYT     EXTRACT LOGICAL BUFFER ID FROM FCB
04B9E 3A71     (00749)          LLS      R7, 1                CONVERT TO WORD INDEX
04B9F 0600     (00750)          EVEN
04BA0 F03F05B3 (00751)          MOVMR    R3, BCTSBA+BS(R7)    GET LOGICAL BUFFER START ADDRESS
               (00752) *
04BA2 F0420001 (00753) LDSSADAM MOVMR    R4, 1(R1)            GET SCROLL ID FROM FCB
04BA4 4078     (00754)          MOVRR    R7, R4
04BA5 B60049FA (00755)          CALL     R0, WAITSIOS         WAIT TILL SCROLL DEVICE FREE
               (00756) *
04BA7 CC0049D0 (00757)          MOVZM    ERRSVAL              INITIALIZE ERROR INDICATOR
04BA9 6026     (00758)          MOVWR    R2, R3               GET IOS PROGRAM SIZE
               (00759)          EVEN
04BAA 842007B4 (00760)          MOVRML   R2, TEMS0            SAVE BA & N
               (00761) *
04BAC 4056     (00762)          MOVRR    R5, R3               COMPUTE PNTR TO SCROLL PROGRAM END
04BAD 4C54     (00763)          ADDRR    R5, R2               ( BA+N )
               (00764) *
04BAE F06A0003 (00765)          MOVMR    R6, 3(R5)            GET ACQUISITION MODE
04BB0 9A6000FF (00766)          ANDIR    R6, MSKSRBYT
04BB2 F06849C9 (00767)          MOVRM    R6, ACQSLIST-16(R4)  SAVE ACQUISITION MODE FOR RUN SCROLL
               (00768) *
04BB4 9C49FFE0 (00769)          ADDIR    R4, -32(R4)          CONVERT SCRLID TO SCROLL INDEX
04BB6 F05A0002 (00770)          MOVMR    R5,2(R5)             GET TRANSFER DIR. FOR BUFFER CONTROL
               (00771) *
               (00772) *  TEST IF TRANSFER DIRECTION LEGAL ( 0 OR 2 )
               (00773) *
04BB8 1910     (00774)          SKP      NEZ
04BB9 2005     (00775)          HOP      LDSSC                0 => OK
04BBA 92500002 (00776)          CMPIR    R5, 2
04BBC 1A10     (00777)          SKPL     FO                   2 => OK
04BBD B0004CBC (00778)          JMP      IOSSER1              OTHERWISE, ERROR
               (00779) *
04BBF 3A51     (00780) LDSSC    LLS      R5, 1                CONVERT TO 0 OR 4
04BC0 F0584B4C (00781)          MOVRM    R5, IOSBSRWI(R4)     MOVE READ/WRITE FLAG INTO TABLE
```

```
04BC2 F05B4B4D (00782)     MOVRM   R5, IOS$SKWI+1(R4)
                (00783) *
04BC4 F0760001 (00784)     MOVMR   R7, B$(R3)          EXTRACT LOGICAL BUFFER IDENTIFIERS
04BC6 506F00FF (00785)     MOVKR   R6, R7, MSK$RBYT    (BID 0) * 2
04BC8 3A61     (00786)     LLS     R6, 1
04BC9 3C77     (00787)     LRS     R7, 7               (BID 1) * 2
                (00788) *
04BCA 405C     (00789)     MOVRR   R5, R6              CHECK BID 0
04BCB 86604CBC (00790)     CALL    R6, BIDSCHK
04BCD 0250     (00791)     TEST    R5                  ERROR ENCOUNTERED?
04BCF 80304CBF (00792)     JMP     IOSSER2, LTZ        YES, EXIT
                (00793) *
04BD0 405F     (00794)     MOVRR   R5, R7              CHECK BID 1
04BD1 86604CBC (00795)     CALL    R6, BIDSCHK
04BD3 0250     (00796)     TEST    R5
04BD4 80304CC2 (00797)     JMP     IOSSER3, LTZ
                (00798) *
04BD6 4058     (00799)     MOVRR   R5, R4              COMPUTE INDEX INTO TRIPLET BID TABLE
04BD7 3C51     (00800)     LRS     R5, 1
04BD8 4C58     (00801)     ADDRR   R5, R4
04BD9 0800     (00802)     EVEN
04BDA E06A4B6C (00803)     MOVRM   R6, IOS$LBI(R5)     STORE BID 0 FOR INTERRUPT LINE 1
04BDC F06A4B6E (00804)     MOVRM   R6, IOS$LBI+2(R5)
                (00805) *
04BDE E07A4B84 (00806)     MOVRM   R7, IOS$LBI+24(R5)  STORE BID 1 FOR INTERRUPT LINE 2
04BE0 F07A4B86 (00807)     MOVRM   R7, IOS$LBI+26(R5)
                (00808) *
04BE2 90760004 (00809)     MOVIR   R7, 4(R3)           COMPUTE POINTER TO BUFFER 2 & 3 IDS
04BE4 4C74     (00810)     ADDRR   R7, R2                ( BA+N+4 )
04BE5 607E     (00811)     MOVWR   R7, R7              GET BUFFER 2 & 3 IDS
                (00812) *
04BE6 506F00FF (00813)     MOVKR   R6, R7, MSK$RBYT    EXTRACT THEM
04BE8 3A61     (00814)     LLS     R6, 1               (BID 2) * 2
04BE9 3C77     (00815)     LRS     R7, 7               (BID 3) * 2
                (00816) *
04BEA F06A4B6D (00817)     MOVRM   R6, IOS$LBI+1(R5)   STORE BID 2 FOR INTERRUPT LINE 1
04BEC E07A4B85 (00818)     MOVRM   R7, IOS$LBI+25(R5)  STORE BID 3 FOR INTERRUPT LINE 2
                (00819) *
04BEE 405C     (00820)     MOVRR   R5, R6              CHECK BID 2
04BEF 86604CBC (00821)     CALL    R6, BIDSCHK
04BF1 0250     (00822)     TEST    R5                  ERROR ENCOUNTERED?
04BF2 80304CC5 (00823)     JMP     IOSSER4, LTZ        YES, EXIT
                (00824) *
04BF4 405F     (00825)     MOVRR   R5, R7              CHECK BID 3
```

```
04BF5 86604CBC           CALL     R6, BIDSCHK
04BF7 0250               TEST     R5                  ERROR ENCOUNTERED?
04BF8 80304CC8           JMP      IOSSER5, LTZ        YES, EXIT
               *
               *  TEST IF SIZE OF BID 0 = INTEGRAL MULTIPLE OF # CHANNELS
               *
04BFA 4056               MOVRR    R5, R3
04BFB 4C54               ADDRR    R5, R2              ( BA+N )
               *
04BFC F06A0003           MOVMR    R6, 3(R5)           EXTRACT # CHANNELS
04BFF 3C68               LRS      R6, 8
               *
04BFF F0760001           MOVMR    R7, 1(R3)           EXTRACT BID 0
04C01 9A7000FF           ANDIR    R7, MSKSRBYT
04C03 3A71               LLS      R7, 1
               *
04C04 F07F0605           MOVMR    R7, BCTSAD+BS(R7)   GET BUFFER SIZE-1
04C06 2671               INCR     R7, 1
04C07 F07007B6           MOVRM    R7, TEMS2           SAVE FOR LATER USE
               *
04C09 0260               TEST     R6
04C0A 81204C13           JMP      LDSSA, LEZ          SKIP TEST IF NULL
               *
               *  SET UP LOOP -- R6 = # CHANNELS, R7 = BUFFER SIZE
               *
04C0C 4F7C     #1        SUBRR    R7, R6              SUBTRACT # CHANNELS
04C0D 80104C13           JMP      LDSSA, EQZ          DIFF. = 0 => NO ERROR
04C0F 80204C0C           JMP      #1, GTZ                   > 0 => CONTINUE
               *
               *  ERROR, SIZE NOT A MULTIPLE OF # CHANNELS
               *
04C11 80004CCB           JMP      IOSSER6
               *
               *  TEST IF SIZE(BID 0) = SIZE(BID 2) IF DOUBLE BUFFERED
               *
04C13 F06A0003 LDSSA     MOVMR    R6, 3(R5)           EXTRACT ACQUISITION MODE
04C15 9A6000FF           ANDIR    R6, MSKSRBYT
04C17 92600001           CMPIR    R6, 1               IF DOUBLE BUFFERED MODE, DO TEST
04C19 81104C27           JMP      LDSSB, NE           OTHERWISE, CONTINUE
               *
04C1B F07A0004           MOVMR    R7, 4(R5)           EXTRACT BID 2
04C1D 9A7000FF           ANDIR    R7, MSKSRBYT
04C1F 3A71               LLS      R7, 1
04C20 F07F0605           MOVMR    R7, BCTSAD+BS(R7)   GET SIZE-1 OF BID 2
```

```
04C22 2671      (00870)          INCR    R7, 1
                (00871) *
04C23 E27007B6  (00872)          CMPMR   R7, TEMS2         = SIZE OF BID 0?
04C25 81104CCF  (00873)          JMP     IOSSER7, NE       NO, ERROR
                (00874) *
04C27 E0520002  (00875) LDSSB    MOVMR   R5, 2(R1)         GET SCROLL TYPE FROM FCB
04C29 92500003  (00876)          CMPIR   R5, 3             DISPATCH ON SCROLL TYPE
04C2B 80104C9B  (00877)          JMP     LDSS01, EQ        JUMP IF IOS-3
04C2D 92500004  (00878)          CMPIR   R5, 4             TEST IF IOS-4
04C2F 80104CA6  (00879)          JMP     LDSS02, EQ        JUMP IF IOS-4
                (00880) *
                (00881) *
                (00882) *          LOAD IOS-2 SCROLL
                (00883) *
                (00884) *
                (00885) *    WRITE THE SCROLL REGISTERS
                (00886) *
04C31 90560006  (00887)          MOVIR   R5, 6(R3)         COMPUTE POINTER TO SCROLL DATA - 1
04C33 4C54      (00888)          ADDRR   R5, R2            ( BA+N+6 )
04C34 606A      (00889)          MOVWR   R6, R5            GET FIRST SCROLL REGISTER ID
04C35 E07BFFFF  (00890)          MOVMR   R7, -1(R5)        GET M = # OF SCROLL REGISTERS TO LOAD
04C37 80104C4A  (00891)          JMP     LDSS0, EQZ        BYPASS LOAD IF NONE, ELSE
04C39 80304CD4  (00892)          JMP     IOSSER9, LTZ      # REG < 0 => ERROR
                (00893) *
                (00894) *
                (00895) *   TEST IF NUMBER AND FIRST SCROLL REGISTER TO LOAD ARE LEGAL
                (00896) *     R6 = 1ST REGISTER TO LOAD
                (00897) *     R7 = # REGISTERS TO LOAD = M
                (00898) *
04C3B 0260      (00899)          TEST    R6                CHECK 1ST REGISTER
04C3C 80304CD1  (00900)          JMP     IOSSER8, LTZ      < 0 => ERROR
04C3E 9260000F  (00901)          CMPIR   R6, 15
04C40 80204CD1  (00902)          JMP     IOSSER8, GT       > 15 => ERROR
                (00903) *
04C42 4C7C      (00904)          ADDRR   R7, R6            CHECK # + 1ST REGISTER
04C43 92700010  (00905)          CMPIR   R7, 16
04C45 80204CD4  (00906)          JMP     IOSSER9, GT       > 16 => ERROR
                (00907) *
04C47 4E7C      (00908)          SUBRR   R7, R6            RESTORE R7 = M
                (00909) *
                (00910) *
04C48 86604DBC  (00911)          CALL    R6, WSRS1         LOAD THE SCROLL REGISTERS
                (00912) *
                (00913) *---  R5 ASSUMED = (BA+N+6+M )
```

```
                      (00914) *
04C4A 2721            (00915) LDSS0     DECR     R2, 1                  ADJUST COUNT
04C4B 2631            (00916)           INCR     R3, 1                  AND START ADDRESS
04C4C 82084C7C        (00917)           XCT      LDSSCRL2(R4)           EXECUTE PROPER BLOCK MOVE
                      (00918) *
                      (00919) *-----  BIND THE LOGICAL BUFFERS
                      (00920) *
                      (00921) *    SET UP FOR CALLS TO IO2SBDR ROUTINE
                      (00922) *
04C4E 0070            (00923)           CLR      R7                     SET UP NULL OFFSET VALUE
04C4F 2651            (00924)           INCR     R5, 1                  POINT INTEGER SCALAR ID OF OFFSET
04C50 606A            (00925)           MOVWR    R6, R5                 GET SCALAR ID
                      (00926) *
04C51 80304C59        (00927)           JMP      LDSSNULL, LTZ          IF < 0, => NULL
04C53 92600080        (00928)           CMPIR    R6, ISVTSSIZ
04C55 81304CD7        (00929)           JMP      IOSSER10, GE           IF > MAX => ERROR
                      (00930) *
04C57 F07C0502        (00931)           MOVMR    R7, ISVTS(R6)          LEGAL ID, GET OFFSET VALUE
04C59 F0704F30        (00932) LDSSNULL  MOVRM    R7, IOBDSOFF           STORE FOR IO2SBDR ROUTINE
                      (00933) *
04C5B C02007B4        (00934)           MOVMRL   R2,TEMS0               RESTORE R2=N, R3=BA
04C5D 4C26            (00935)           ADDRR    R2, R3                 (BA + N )
04C5F F0740004        (00936)           MOVMR    R7, 4(R2)              R7 = BID 3 : 2 FOR LATER USE
04C60 F0484C7D        (00937)           MOVMR    R4, LDSSCRL2+HS(R4)    SET UP SCROLL LOAD ADDRESS
                      (00938) *
04C62 F0260001        (00939)           MOVMR    R2, 1(R3)              GET BID 1 : 0
04C64 506400FF        (00940)           MOVKR    R6, R2, MSKSRBYT       R6 = BID 0
04C66 2651            (00941)           INCR     R5, 1                  R5 = POINTER TO BINDING CHAIN ANCHOR
04C67 2632            (00942)           INCR     R3, 2                  R3 = POINTER TO SCROLL PROGRAM
                      (00943) *---
04C68 86104DC8        (00944)           CALL     R1, IO2SBDR            BIND BUFFER 0
                      (00945) *
04C6A 2651            (00946)           INCR     R5, 1                  STEP TO NEXT CHAIN ANCHOR
04C6B 5064FF00        (00947)           MOVKR    R6, R2, MSKSLBYT       GET BID 1
04C6D 3C68            (00948)           LRS      R6, 8
                      (00949) *---
04C6E 86104DC8        (00950)           CALL     R1, IO2SBDR            BIND BUFFER 1
                      (00951) *
04C70 2651            (00952)           INCR     R5, 1                  STEP TO NEXT CHAIN ANCHOR
04C71 506F00FF        (00953)           MOVKR    R6, R7, MSKSRBYT       GET BID 2
                      (00954) *---
04C73 86104DC8        (00955)           CALL     R1, IO2SBDR            BIND BUFFER 2
                      (00956) *
04C75 2651            (00957)           INCR     R5, 1                  STEP TO NEXT CHAIN ANCHOR
```

```
04C76 506FFF00 (00958)           MOVBR    R6, R7, MSKSLBYT      GET BID 3
04C78 3C68     (00959)           LRS      R6, 8
               (00960) *---
04C79 86104DC8 (00961)           CALL     R1, IO2$BDR           BIND BUFFER 3
               (00962) *
               (00963) *
04C7B 0F70     (00964)           RETURN
               (00965)           EVEN
               (00966) *
               (00967) *
               (00968) *  IOS-2 LOAD INSTRUCTIONS
               (00969) *
               (00970) *
04C7C D535F000 (00971) LDSSCRL2 BMOVE    R3, R2, $1F000        LOAD SCROLL 16
04C7E D535F200 (00972)           BMOVE    R3, R2, $1F200        LOAD SCROLL 17
04C80 D535F400 (00973)           BMOVE    R3, R2, $1F400        LOAD SCROLL 18
04C82 D535F600 (00974)           BMOVE    R3, R2, $1F600        LOAD SCROLL 19
04C84 D535F800 (00975)           BMOVE    R3, R2, $1F800        LOAD SCROLL 20
04C86 D535FA00 (00976)           BMOVE    R3, R2, $1FA00        LOAD SCROLL 21
04C88 D535FC00 (00977)           BMOVE    R3, R2, $1FC00        LOAD SCROLL 22
04C8A D535FE00 (00978)           BMOVE    R3, R2, $1FE00        LOAD SCROLL 23
               (00979) *
               (00980) *
               (00981)           EJECT
```

```
                    (00982) *
                    (00983) *  SUBROUTINE TO CHECK BID ARGUMENT
                    (00984) *           WITHIN LIMITS AND IF DEFINED
                    (00985) *
                    (00986) *      LIMITS:
                    (00987) *        ( 0 .LE. BID*2 .LE. BCTSSIZ*2 )
                    (00988) *
                    (00989) *        ENTER WITH R5 = BID * 2
                    (00990) *
                    (00991) *
                    (00992) *        EXIT WITH R5 = 0 => NO ERROR
                    (00993) *                     =-1 => ERROR
                    (00994) *
                    (00995) *        ROUTINE USES R6 AND R7 AS SCRATCH REGISTERS
                    (00996) *
                    (00997) *
04C8C 0070          (00998) BIDSCHK  CLR      R7                    INITIALIZE ERROR INDICATOR
04C8D 0250          (00999)          TEST     R5                    BID
04C8E 80104C9A      (01000)          JMP      BIDSRET, EQZ          IF NULL, RETURN
04C90 1820          (01001)          SKP      GTZ                   IF .LT. 0
04C91 0C70          (01002)          CCR      R7                    FLAG ERROR
                    (01003) *
04C92 92500080      (01004)          CMPIR    R5, BCTSSIZ*WS        IF .GE. MAX
04C94 1830          (01005)          SKP      LT
04C95 0C70          (01006)          CCR      R7                    FLAG ERROR
                    (01007) *
04C96 D93A0686      (01008)          SMBC     BITSBD, BCTSAT(R5)    IF BUFFER UNDEFINED,
04C98 0C70          (01009)          CCR      R7                    FLAG ERROR
                    (01010) *
04C99 405F          (01011)          MOVRR    R5, R7                MOVE INTO R5
                    (01012) *
04C9A 0F70          (01013) BIDSRET  RETURN
                    (01014) *
                    (01015) *
                    (01016)          EJECT
```

```
            PACKAGE  ---- APR 18, 1980 ----  PROGRAM # 840001,01A
          *    TO PROCESS THE LOAD IOS SCROLL FCB

                     (01017) !           LOAD IOS-3 SCROLL
                     (01018) *
                     (01019) *
                     (01020) LOS$01    LRS       R2, 1              ADJUST REPEAT COUNT
                     (01021)           DECR      R2, RS
                     (01022)           XCT       LOSSCRL3(R4)       EXECUTE PROPER BLOCK MOVE
                     (01023)           RETURN
                     (01024)           EVEN
                     (01025) *
                     (01026) *
                     (01027) *  IOS-3 LOAD INSTRUCTIONS
                     (01028) *
                     (01029) *
04CA0 D735F880 (01030) LOSSCRL3 BMOVEL    R3, R2, $1F880      LOAD SCROLL 16
04CA2 D735F900 (01031)          BMOVEL    R3, R2, $1F900      LOAD SCROLL 17
04CA4 D735F980 (01032)          BMOVEL    R3, R2, $1F980      LOAD SCROLL 18
                     (01033) *
                     (01034) *
                     (01035)          EJECT
```

```
04CA6 3C21      (01036) LDS$02   LRS     R2, 1             ADJUST REPEAT COUNT
04CA7 2721      (01037)          DECR    R2, R$
04CA8 820B4CAC  (01038)          XCT     LDSSCRL4(R4)      EXECUTE PROPER LPROCL
04CAA 0E70      (01039)          RETURN
04CAB 0800      (01040)          EVEN
                (01041) *
04CAC D635FE1E  (01042) LDSSCRL4 LPROCL  R3, R2, $1FFE1E   LOAD SCROLL 16
04CAE D635FE3E  (01043)          LPROCL  R3, R2, $1FFE3E   LOAD SCROLL 17
04CB0 D635FE5E  (01044)          LPROCL  R3, R2, $1FFE5E   LOAD SCROLL 18
04CB2 D635FE7E  (01045)          LPROCL  R3, R2, $1FFE7E   LOAD SCROLL 19
04CB4 D635FE9E  (01046)          LPROCL  R3, R2, $1FFE9E   LOAD SCROLL 20
04CB6 D635FEBE  (01047)          LPROCL  R3, R2, $1FFEBE   LOAD SCROLL 21
04CB8 D635FEDE  (01048)          LPROCL  R3, R2, $1FFEDE   LOAD SCROLL 22
04CBA D635FEFE  (01049)          LPROCL  R3, R2, $1FFEFE   LOAD SCROLL 23
                (01050) *
                (01051)          EJECT
```

```
                    (01052) *
                    (01053) *  ERROR INDICATORS
                    (01054) *
04CBC 90700001 (01055) IOSSER1  MOVIR    R7, 1
04CBE 201E     (01056)          HOP      IOSSERR
04CBF 90700002 (01057) IOSSER2  MOVIR    R7, 2
04CC1 201B     (01058)          HOP      IOSSERR
04CC2 90700003 (01059) IOSSER3  MOVIR    R7, 3
04CC4 2018     (01060)          HOP      IOSSERR
04CC5 90700004 (01061) IOSSER4  MOVIR    R7, 4
04CC7 2015     (01062)          HOP      IOSSERR
04CC8 90700005 (01063) IOSSER5  MOVIR    R7, 5
04CCA 2012     (01064)          HOP      IOSSERR
04CCB 90700006 (01065) IOSSER6  MOVIR    R7, 6
04CCD 200F     (01066)          HOP      IOSSERR
04CCE 90700007 (01067) IOSSER7  MOVIR    R7, 7
04CD0 200C     (01068)          HOP      IOSSERR
04CD1 90700008 (01069) IOSSER8  MOVIR    R7, 8
04CD3 2009     (01070)          HOP      IOSSERR
04CD4 90700009 (01071) IOSSER9  MOVIR    R7, 9
04CD6 2006     (01072)          HOP      IOSSERR
04CD7 9070000A (01073) IOSSER10 MOVIR    R7, 10
04CD9 2003     (01074)          HOP      IOSSERR
04CDA 9070000B (01075) IOSSER11 MOVIR    R7, 11
04CDC 2000     (01076)          HOP      IOSSERR
                    (01077) *
04CDD E07049D0 (01078) IOSSERR  MOVRM    R7, ERRSVAL        STORE ERROR INDICATOR
04CDF 90700014 (01079)          MOVIR    R7, ERRSIOS        FLAG IOS ERROR
04CE1 80001AFA (01080)          JMP      ERRORS             EXIT
                    (01081) *
04CE3 0800     (01082)          EVEN
```

```
* RNSS      MODULE TO PROCESS THE RUN IOS SCROLL FCB
*
*
*
*  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
*
*
*        !                         !                        !
*  WORD  !        LEFT BYTE        !       RIGHT BYTE       !
*        !                         !                        !
*  -----!-------------------------!------------------------!
*        !                         !                        !
*   0    !   POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)!
*        !                         !                        !
*  -----!-------------------------!------------------------!
*        !                         !                        !
*   1    !          67             !           0            !
*        !                         !                        !
*  -----!-------------------------!------------------------!
*        !                         !                        !
*   2    !               SCROLL IDENT                       !
*        !                         !                        !
*  -----!-------------------------!------------------------!
*        !                         !                        !
*   3    !               SCROLL TYPE                        !
*        !                         !                        !
*  -----!-------------------------!------------------------!
*        !                         !                        !
*   4    !          SCROLL START ADDRESS                    !
*        !                         !                        !
*  -----!-------------------------!------------------------!
*        !                         !                        !
*   5    !          0              !           0            !
*        !                         !                        !
*  -----!-------------------------!------------------------!
*
*
*
*
           EJECT
```

```
04CF4 E0720001 (01123) RNSS     MOVMR    R7, 1(R1)            GET SCROLL ID
04CF6 860049EA (01124)          CALL     R0, WAITSIOS         WAIT TILL SCROLL DEVICE FREE
04CF8 86104D06 (01125)          CALL     R1, RNSSINT          SET UP BUFFERS AND INTERRUPTS
               (01126) *
04CFA 9C7FFFE0 (01127)          ADDIR    R7, -32(R7)          CONVERT TO SCROLL INDEX
04CFC 0D60     (01128)          CLR      R6                   SET UP REGISTER FOR START SCROLL
04CFD 0800     (01129)          EVEN
04CFF C0420002 (01130)          MOVMRL    R4, 2(R1)           R4 = IOS TYPE ; R5 = START LITERAL
04CF0 92400003 (01131)          CMPIR    R4, 3                DISPATCH ON SCROLL TYPE
04CF2 80104D40 (01132)          JMP      RNSS01, EQ           JUMP IF IOS-3
               (01133) *
04CF4 92400004 (01134)          CMPIR    R4, 4                TEST FOR IOS-4
04CF6 80104D4A (01135)          JMP      RNSS02, EQ           JUMP IF IOS-4
               (01136) *
               (01137) * START IOS-2 SCROLL
               (01138) *
04CF8 3A58     (01139)          LLS      R5, 8                MOVE START ADDRESS TO LEFT BYTE
04CF9 E0DF4030 (01140)          MOVRM    R5, @RNSSIOS2(R7)    START THE SCROLL
04CFB 3C71     (01141)          LRS      R7, 1
04CFC F02F4909 (01142)          MOVMR    R2, ACQSLIST(R7)     GET ACQUISITION MODE FLAG
               (01143) *
04CFE 1810     (01144)          SKP      EOZ                  SKIP IF DISCRETE SAMPLING
04CFF 0F70     (01145)          RETURN                        ELSE, EXIT
               (01146)          EVEN
               (01147) *
04D00 90600009 (01148)          MOVIR    R6, 9                POINT TO SYNCSTOP REGISTER
04D02 3A71     (01149)          LLS      R7, 1
04D03 E0AE4030 (01150)          MOVRM    R2, @RNSSIOS2(R7)    THEN REFERENCE IT TO SET SYNCSTOP
04D05 0F70     (01151)          RETURN
               (01152)          EVEN
               (01153) *
               (01154)          EJECT
```

```
04D06 F0704D61 (01155) RNSSINT  MOVRM   R7, RNSSFINT+HS      SET-UP, THEN
04D08 82004D60 (01156)          XCT     RNSSFINT             ENABLE SCROLL INTERRUPT, LEVEL 1
04D0A F0704D63 (01157)          MOVRM   R7, RNSSFINT+3*HS    DITTO FOR LEVEL 2
04D0C 82004D62 (01158)          XCT     RNSSFINT+WS
04D0E F0704D65 (01159)          MOVRM   R7, RNSSFINT+5*HS    DITTO FOR LEVEL 3
04D10 82004D64 (01160)          XCT     RNSSFINT+2*WS
               (01161) *
04D12 90200001 (01162)          MOVIR   R2, 1
04D14 F02F49C1 (01163)          MOVRM   R2, IOSSFLG-16(R7)   FLAG SCROLL BUSY
               (01164) *
04D16 9C7FFFE0 (01165)          ADDIR   R7, -32(R7)          CONVERT TO INDEX
               (01166) *
04D18 2671     (01167)          INCR    R7, 1                FORCE INTERRUPT POINTERS AND BUFFER FLAGS
04D19 0800     (01168)          EVEN                         TO CORRECT STATE
04D1A 86704B12 (01169)          CALL    R7, IOSSINT
04D1C 9C700010 (01170)          ADDIR   R7, 16               POINT TO BUFFERS 1 AND 3
04D1E 86704B12 (01171)          CALL    R7, IOSSINT
               (01172) *
04D20 1000003F (01173)          CINT    IOEVS63, ILVLS1      CLEAR I/O DONE
               (01174) *
04D22 9E700011 (01175)          SUBIR   R7, 17
04D24 406F     (01176)          MOVRR   R6, R7               COMPUTE POINTER TO CSW WORD
04D25 3A71     (01177)          LLS     R7, 1
04D26 4C7C     (01178)          ADDRR   R7, R6
04D27 906F0320 (01179)          MOVIR   R6, CSWSIOS-WS(R7)
04D29 CA6F02B6 (01180)          POPMIL  R6, CSWSI161(R7)
04D2B CA6F02B8 (01181)          POPMIL  R6, CSWSI162(R7)
04D2D CA6F02BA (01182)          POPMIL  R6, CSWSI163(R7)
               (01183) *
04D2F 0F70     (01184)          RETURN
               (01185)          EVEN
               (01186) *
               (01187)          EJECT
```

```
                 (01188) *  START ADDRESS TABLE FOR IOS2
                 (01189) *
04D30 001DF1FF  (01190) RNSSIOS2 ADDR    $1F1FF(R6,1)        START SCROLL 16
04D32 001DF3FF  (01191)          ADDR    $1F3FF(R6,1)        START SCROLL 17
04D34 001DF5FF  (01192)          ADDR    $1F5FF(R6,1)        START SCROLL 18
04D36 001DF7FF  (01193)          ADDR    $1F7FF(R6,1)        START SCROLL 19
04D38 001DF9FF  (01194)          ADDR    $1F9FF(R6,1)        START SCROLL 20
04D3A 001DFBFF  (01195)          ADDR    $1FBFF(R6,1)        START SCROLL 21
04D3C 001DFDFF  (01196)          ADDR    $1FDFF(R6,1)        START SCROLL 22
04D3E 001DFFFF  (01197)          ADDR    $1FFFF(R6,1)        START SCROLL 23
                 (01198) *
                 (01199) *  START IOS-3 TYPE SCROLL
                 (01200) *
04D40 F0DF1D44  (01201) RNSS01   MOVRM   R5, @RNSSIOS3(R7)   START THE SCROLL
04D42 0F70      (01202)          RETURN
04D43 0800      (01203)          EVEN
                 (01204) *
                 (01205) *  START ADDRESSES FOR IOS-3
                 (01206) *
04D44 001DFFDC  (01207) RNSSIOS3 ADDR    $1FFDC(R6,1)        START SCROLL 16
04D46 001DFFEC  (01208)          ADDR    $1FFEC(R6,1)        START SCROLL 17
04D48 001DFFFC  (01209)          ADDR    $1FFFC(R6,1)        START SCROLL 18
                 (01210) *
                 (01211) *  START IOS-4 TYPE SCROLL
                 (01212) *
04D4A 3A5C      (01213) RNSS02   LLS     R5, 12              MOVE START ADDR TO LEFT MOST DIGIT
04D4B 0800      (01214)          EVEN
04D4C F0DF4D50  (01215)          MOVRM   R5, @RNSSIOS4(R7)   START THE SCROLL
04D4E 0F70      (01216)          RETURN
04D4F 0800      (01217)          EVEN
                 (01218) *
                 (01219) *  START ADDRESSES FOR IOS-4
                 (01220) *
04D50 001DFF1A  (01221) RNSSIOS4 ADDR    $1FF1A(R6,1)        START SCROLL 16
04D52 001DFF3A  (01222)          ADDR    $1FF3A(R6,1)        START SCROLL 17
04D54 001DFF5A  (01223)          ADDR    $1FF5A(R6,1)        START SCROLL 18
04D56 001DFF7A  (01224)          ADDR    $1FF7A(R6,1)        START SCROLL 19
04D58 001DFF9A  (01225)          ADDR    $1FF9A(R6,1)        START SCROLL 20
04D5A 001DFFBA  (01226)          ADDR    $1FFBA(R6,1)        START SCROLL 21
04D5C 001DFFDA  (01227)          ADDR    $1FFDA(R6,1)        START SCROLL 22
04D5E 001DFFFA  (01228)          ADDR    $1FFFA(R6,1)        START SCROLL 23
                 (01229) *
                 (01230)          EJECT
```

```
                (01231) *
                (01232) *
                (01233) *  INTERRUPT ENABLE INSTRUCTIONS
                (01234) *
04D60 12900000  (01235) RNSSEINT EINT     MSS, ILVLS1
04D62 12A00000  (01236)          EINT     MSS, ILVLS2
04D64 12B00000  (01237)          EINT     MSS, ILVLS3
                (01238) *
                (01239)          EVEN
```

```
' RAAS      MODULE TO PROCESS THE RUN ADAM AND AOM FCB
*
*
*
*  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
*
*
*          !                          !                          !
*   WORD   !        LEFT BYTE         !        RIGHT BYTE        !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*          !                          !                          !
*    0     !   POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)   !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*          !                          !                          !
*    1     !           68             !          ADAMID          !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*          !                          !                          !
*    2     !         ADAMSA           !          AOMID           !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*          !                          !                          !
*    3     !          AOMSA           !            0             !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*          !                          !                          !
*    4     !            0             !            0             !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*          !                          !                          !
*    5     !            0             !            0             !
*          !                          !                          !
*   -------!--------------------------!--------------------------!
*
*
*
*
           EJECT
```

```
                 (01280) *
                 (01281) *             REGISTER USAGE
                 (01282) *
                 (01283) *             R1 POINTS TO FCB#
                 (01284) *             R2 POINTS TO FCB#
                 (01285) *             R3 = ADAMID
                 (01286) *             R4 = ADAMSA
                 (01287) *             R5 = AOMID
                 (01288) *             R6 = AOMSA
                 (01289) *
                 (01290) *
                 (01291) *
04D66 4022       (01292) MPRAAS  MOVRR    R2,R1                  ;COPY R1 TO R2
04D67 7034000FF  (01293)         MOVWK    R3,R2,MSKSRBYT         ;(R3) <---- ADAMID
04D69 2621       (01294)         INCR     R2,1                   ;R2 POINTS TO NEXT WORD IN FCB
04D6A 7044FF00   (01295)         MOVWK    R4,R2,MSKSLBYT         ;(R4) <----- ADAMSA
04D6C 705400FF   (01296)         MOVWK    R5,R2,MSKSRBYT         ;(R5) <----- AOMID
04D6E 2621       (01297)         INCR     R2,1                   ;R2 POINTS TO NEXT WORD OF FCB
04D6F 7064FF00   (01298)         MOVWK    R6,R2,MSKSLBYT         ;(R6) <------ AOMSA
                 (01299) *
04D71 4076       (01300)         MOVRR    R7, R3
04D72 860049FA   (01301)         CALL     R0, WAITSIOS           WAIT TILL ADAM FREE
04D74 86104D06   (01302)         CALL     R1, RNSSINT            SET UP BUFFERS AND INTERRUPTS
                 (01303) *
04D76 407A       (01304)         MOVRR    R7, R5
04D77 860049FA   (01305)         CALL     R0, WAITSIOS           WAIT TILL AOM FREE
04D79 86104D06   (01306)         CALL     R1, RNSSINT            SET UP BUFFERS AND INTERRUPTS
                 (01307) *
04D7B 9C37FFE0   (01308)         ADDIR    R3, -32(R3)            CONVERT TO SCROLL INDEX
04D7D 9C5BFFE0   (01309)         ADDIR    R5, -32(R5)            CONVERT TO SCROLL INDEX
                 (01310) *
04D7F 07F0       (01311)         SCS       14                    ;MASTER DISABLE THE INTERRUPTS
04D80 F0C64D30   (01312)         MOVRM     R4,@RNSSIOS2(R3)      ;START ADAM
04D82 F0FA4D30   (01313)         MOVRM     R6,@RNSSIOS2(R5)      ;START AOM
04D84 03F0       (01314)         CCS       14                    ;MASTER ENABLE THE INTERRUPTS
                 (01315) *
04D85 3C31       (01316)         LRS      R3, 1
04D86 F02649D9   (01317)         MOVMR    R2, ACQSLIST(R3)       GET ACQUISITION MODE FOR ADAM
04D88 81104D8F   (01318)         JMP      MPRAAS0, NEZ
                 (01319) *
04D8A 90600009   (01320)         MOVIR    R6, 9                  IF = 0,
04D8C 3A31       (01321)         LLS      R3, 1
04D8D F0A64D30   (01322)         MOVRM    R2, @RNSSIOS2(R3)      SET SYNCSTOP REGISTER
                 (01323) *
```

```
04D8F 3C51      (01324) MPRAAS0  LRS     R5, 1
04D90 F02A49D9  (01325)          MOVMR   R2, ACQSLIST(R5)     GET ACQUISITION MODE FOR AOM
04D92 81104D99  (01326)          JMP     MPRAAS1, NEZ
                (01327) *
04D94 90600009  (01328)          MOVIR   R6, 9                IF = 0,
04D96 3A51      (01329)          LLS     R5, 1
04D97 F0AA4D30  (01330)          MOVRM   R2, @RNSSIOS2(R5)    SET SYNCSTOP REGISTER
                (01331) *
04D99 0F70      (01332) MPRAAS1  RETURN
                (01333)          EVEN
```

```
' RSRS       MODULE TO PROCESS THE READ FROM SCROLL REGISTERS FCB
*
*
*
*  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
*
*
*            !                               !                              !
*   WORD     !          LEFT BYTE            !          RIGHT BYTE          !
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*            !                               !                              !
*     0      !   POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)!
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*            !                               !                              !
*     1      !          70                   !INTEGER SCALAR IDENTIFIER!
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*            !                               !                              !
*     2      !               SCROLL IDENTIFIER                              !
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*            !                               !                              !
*     3      !                 SCROLL TYPE                                  !
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*            !                               !                              !
*     4      !              STARTING REGISTER                               !
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*            !                               !                              !
*     5      !                    COUNT                                     !
*            !                               !                              !
*   -----!------------------------------!------------------------------!
*
*
*
*
           EJECT
```

```
                  (01374) *
                  (01375) *  MODULE ASSUMES TOS-2 ONLY
                  (01376) *
04D9A 3D7200FF    (01377) RSRS     MOVWK    R7, R1, MSKSRBYT         EXTRACT INTEGER TABLE IDENTIFIER
04D9C 9C700502    (01378)          ADDIR    R7, TSVTS                CONVERT TO MAP ADDRESS
04D9E F0704DB1    (01379)          MOVRM    R7, RSRSBMOV+HS          INSTALL IN BLOCK MOVE INST.
04DA0 F0420001    (01380)          MOVMR    R4, 1(R1)                GET SCROLL IDENT
04DA2 9C49FFE0    (01381)          ADDIR    R4, -32(R4)              CONVERT SCROLL ID TO WORD INDEX
                  (01382) *
04DA4 C0520003    (01383)          MOVMRL   R5, 3(R1)                GET STARTING REGISTER AND COUNT
04DA6 F0784D31    (01384)          MOVMR    R7, RNSS1OS2+HS(R4)      CONVERT REGISTER ID TO PSUDO MEM. A
04DA8 2671        (01385)          INCR     R7, 1                    ADJUST POINTER FOR BMOVE
04DA9 3A71        (01386)          LLS      R7, 1                    FORCE BIT 18 TO ZERO
04DAA 3C71        (01387)          LRS      R7, 1
04DAB 4C7A        (01388)          ADDRR    R7, R5                   POINT TO REGISTER TO START THE READ
04DAC 2761        (01389)          DECR     R6, 1                    ADJUST REPEAT COUNT
04DAD 82004DB0    (01390)          XCT      RSRSBMOV                 READ THE REGISTERS
04DAF 0F70        (01391)          RETURN                            RETURN FOR NEXT FCB
                  (01392) *
                  (01393) *
04DB0 D57C0000    (01394) RSRSBMOV BMOVE    R7, R6, MSS              BLOCK MOVE INST. FOR READ
                  (01395)          EVEN
```

```
(01396) * WSRS      MODULE TO PROCESS THE WRITE INTO SCROLL REGISTERS FCB
(01397) *
(01398) *
(01399) *
(01400) *  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
(01401) *
(01402) *
(01403) *        !                          !                          !
(01404) *  WORD  !         LEFT BYTE        !        RIGHT BYTE        !
(01405) *        !                          !                          !
(01406) *  -----!--------------------------!--------------------------!
(01407) *        !                          !                          !
(01408) *   0    !   POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)!
(01409) *        !                          !                          !
(01410) *  -----!--------------------------!--------------------------!
(01411) *        !                          !                          !
(01412) *   1    !            71            !INTEGER SCALAR IDENTIFIER!
(01413) *        !                          !                          !
(01414) *  -----!--------------------------!--------------------------!
(01415) *        !                          !                          !
(01416) *   2    !               SCROLL IDENTIFIER                     !
(01417) *        !                          !                          !
(01418) *  -----!--------------------------!--------------------------!
(01419) *        !                          !                          !
(01420) *   3    !                 SCROLL TYPE                         !
(01421) *        !                          !                          !
(01422) *  -----!--------------------------!--------------------------!
(01423) *        !                          !                          !
(01424) *   4    !               STARTING REGISTER                     !
(01425) *        !                          !                          !
(01426) *  -----!--------------------------!--------------------------!
(01427) *        !                          !                          !
(01428) *   5    !                    COUNT                            !
(01429) *        !                          !                          !
(01430) *  -----!--------------------------!--------------------------!
(01431) *
(01432) *
(01433) *
(01434) *
(01435)          EJECT
```

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

UNCLASSIFIED NL

6 OF 9

AD
A091663

```
                   *
                   *  MODULE ASSUMES IOS-2 ONLY
                   *
04DB2 F0420001     WSR$      MOVBR    R4, 1(R1)              GET SCROLL ID
04DB4 9C49FFF0               ADDIR    R4, -32(R4)            CONVERT SCROLL ID TO WORD INDEX
                   *
04DB6 705200FF               MOVBK    R5, R1, MSK$BBYT       GET INTEGER TABLE ID
04DB8 9C500501               ADDIR    R5, ISVTS-1            CONVERT TO MAP ADDRESS-1
04DBA C0620003               MOVBRL   R6, 3(R1)              GET START REG. AND COUNT
                   *
                   *   ENTER HERE FROM LDS$ WITH REG 4-7 SET UP PROPERLY
                   *
                   *         R4       SCROLL INDEX
                   *         R5       POINTER - 1 TO DATA TO LOAD SCROLL REGISTER
                   *         R6       1ST SCROLL REGISTER
                   *         R7       # SCROLL REGISTERS TO LOAD
                   *
04DBC FC684D31     WSR$1     ADDMR    R6, RNS$IOS2+HS(R4)    CONVERT REG. ID TO PSUEDO-MEM. ADDR.
04DBE 2662                   INCR     R6, 2
04DBF F0604DC7               MOVRM    R6, WSR$BMOV+HS        STORE IN BLOCK MOVE INSTRUCTION
04DC1 2771                   DECR     R7, 1                  CONVERT COUNT TO NO. OF REPEATS
04DC2 82004DC6               XCT      WSR$BMOV               WRITE INTO THE REGISTERS.
04DC4 0E70                   RETURN
04DC5 0800                   EVEN
                   *
04DC6 D55F0000     WSR$BMOV  BMOVE    R5, R7, MS$+$10000     BLOCK MOVE INSTRUCTION FOR WRITE
                             EVEN
```

```
                 *       IO2SBDR    IOS SCROLL PROGRAM BINDING SUBROUTINE
                 *
                 *  THIS MODULE BINDS THE SPECIFIED ATTRIBUTES OF A LOGICAL BUFFER
                 *  TO THE IOS-2 PROGRAM. THE UNBOUND SCROLL PROGRAM MUST HAVE BEEN
                 *  LOADED PRIOR TO CALLING THIS PROGRAM.
                 *  THE CHAIN INFORMATION IS CONTAINED IN THE RIGHTMOST 15 BITS OF A
                 *  32 BIT IOS-2 INSTRUCTION.
                 *
                 *  ROUTINE ASSUMES WL = 0 => LONG (16 BIT)
                 *
                 *  THE FORMAT OF THE CHAIN DESCRIPTOR IS:
                 *
                 *  BITS:   0-7   BACKWARD (WORD) POINTER TO THE NEXT CHAIN ENTRY
                 *  BITS:   8-14  ATTRIBUTE SPECIFIER
                 *          VALUE           ATTRIBUTE
                 *            0             BASE ADDRESS
                 *            1             BASE ADDRESS - SEPARATION
                 *            2             BUFFER SEPERATION
                 *            3             BUFFER EXTENT
                 *            4             BUFFER SIZE
                 *            5             BUFFER SIZE - OFFSET
                 *            6             OFFSET
                 *
                 *
                 *  THIS MODULE IS CALLED WITH:
                 *
                 *    R3 = BASE ADDRESS OF SCROLL PROGRAM ON BUS 1
                 *    R4 = SCROLL PROGRAM LOAD ADDRESS (LEAST SIGNIFICANT 16 BITS)
                 *    R5 = POINTER TO BINDING CHAIN ANCHOR
                 *    R6 = LOGICAL BUFFER ID
                 *
                 *    IOBDSOFF CONTAINS INTEGER OFFSET
                 *
                 *----------
                 *
                 *        BID .LE. 0 OR
                 *        BINDING CHAIN ANCHOR .LT. 0
                 *
                 *            => NO BINDING DONE
                 *
                 *----------
                 *
04DC8 605A       IO2SBDR  MOVWR    R5, R5              GET BINDING CHAIN ANCHOR
04DC9 1930                SKP      GEZ
```

```
04DCA 0F70      (01507)          RETURN                          EXIT IF NULL
                (01508) *
04DCB 4C6C      (01509)          ADDRR    R6, R6                 CONVERT BUFFER ID TO WORD INDEX
04DCC 1820      (01510)          SKP      GTZ
04DCD 0F70      (01511)          RETURN                          EXIT IF NULL
                (01512) *
                (01513) *---  REGISTER USAGE:
                (01514) *
                (01515) *        R1       INSTRUCTION TO BE BOUND
                (01516) *        R2       ATTRIBUTE & THEN RIGHT HALF OF INSTRUCTION
                (01517) *        R7       DISPLACEMENT TO NEXT INSTRUCTION
                (01518) *
04DCF 3A51      (01519)          LLS      R5, 1                  ADJUST BINDING POINTER
04DCF 0800      (01520)          EVEN
04DD0 E0304F21  (01521)          MOVRM    R3, IOBDSPPT+H$        SET POINTER TO IOS PROGRAM ON BUS 1
04DD2 E0404F1F  (01522)          MOVRM    R4, IOBDSLPT+H$        SET SCROLL ADDRESS
                (01523) *
                (01524) *   GET NEXT INSTRUCTION TO BE BOUND
                (01525) *   DISPATCH TO PROPER BINDING ROUTINE
                (01526) *
04DD4 C0904F20  (01527) I02SBDRN MOVRML   R1, @IOBDSPPT          GET INSTRUCTION TO BE BOUND
04DD6 507400FF  (01528)          MOVKR    R7, R2, MSK$RBYT       EXTRACT DISPLACEMENT TO NEXT INSTRUCT.
04DD8 3A71      (01529)          LLS      R7, 1                  ADJUST DISPLACEMENT TO HALF WORD
04DD9 3C27      (01530)          LRS      R2, 7                  POSITION ATTRIBUTE SPECIFIER AS WORD INDE
04DDA 9A2000FF  (01531)          ANDIR    R2, $FF                RESET LEAST SIGNIFICANT BIT
04DDC 80844F22  (01532)          JMP      @I02SBDRD(R2)          DISPATCH TO PROPER BINDING MODULE
                (01533)          EVEN
                (01534) *
                (01535) *--- BASE ADDRESS BINDING ---
                (01536) *
04DDF C03C0582  (01537) I02SBDR0 MOVRML   R3, BCTSBA(R6)         GET BASE ADDRESS ATTRIBUTES OF BUFFER
04DE0 9A11FFF8  (01538)          ANDIR    R1, $1FFF8             CLEAR OUT BUS AND BIT 16
04DE2 56160007  (01539)          IORKR    R1, R3, $7             MERGE BUS AND BIT 16 FROM BUFFER
                (01540)          EVEN
                (01541) *
                (01542) *---  PATH FOR BINDING INTO IOS MEMORY ---
                (01543) *---  AND FOR LOOPING TO NEXT INSTRUCTION
                (01544) *
04DE4 4028      (01545) #0       MOVRR    R2, R4                 GET LOW ORDER BITS
                (01546) *
04DE5 84904F1F  (01547) #1       MOVRML   R1, @IOBDSLPT          MOVE BOUND INSTRUCTION TO IOS2 MEM.
04DE7 0270      (01548)          TEST     R7                     ANOTHER INSTRUCTION IN CHAIN?
04DE8 1910      (01549)          SKP      NEZ
04DE9 0F70      (01550)          RETURN                          NO, EXIT
```

```
                   (01551) *
04DEA 4E5F         (01552)            SUBRR    R5, R7              YES, COMPUTE DISPLACEMENT TO NEXT INST.
04DEB B0304CDA     (01553)            JMP      IOS$ER11, LTZ       BINDING CHAIN ERROR, EXIT
04DED 211A         (01554)            HOP      IO2$BDRN            OK, GET NEXT INST TO BE BOUND
                   (01555) *
                   (01556)            EVEN
                   (01557) *
                   (01558) *--- BASE ADDRESS - SEPARATION BINDING ---
                   (01559) *
04DEF C03C0582     (01560) IO2$BDR1 MOVMRL   R3, BCT$BA(R6)      GET BASE ADDRESS ATTRIBUTES OF BUFFER
04DF0 9A11FFF8     (01561)            ANDIR    R1, $1FFF8          CLEAR OUT BUS AND BIT 16
04DF2 56160006     (01562)            IORRR    R1, R3, $6          MERGE BUS ONLY
04DF4 FE4C0604     (01563)            SUBMR    R4, BCTSAD(R6)      SUBTRACT SEPARATION
04DF6 0630         (01564)            DAC      R3
04DF7 56160001     (01565)            IORRR    R1, R3, 1           MERGE HIGH ORDER ADDRESS BIT
04DF9 2116         (01566)            HOP      #0                  GO MOVE INST TO SCROLL MEMORY
                   (01567)            EVEN
                   (01568) *
                   (01569) *--- BUFFER SEPARATION BINDING ---
                   (01570) *
04DFA E03C0604     (01571) IO2$BDR2 MOVMR    R3, BCTSAD(R6)      GET BUFFER SEPARATION
04DFC 50267FFF     (01572)            MOVKR    R2, R3, $7FFF       MERGE 15 BIT SEPARATION
04DFE 211A         (01573)            HOP      #1                  GO MOVE INST TO SCROLL MEMORY
04DFF 0800         (01574)            EVEN
                   (01575) *
                   (01576) *--- BUFFER EXTENT BINDING ---
                   (01577) *
04E00 C03C0604     (01578) IO2$BDR3 MOVMRL   R3, BCTSAD(R6)      GET BUFFER SEPARATION AND SIZE
04E02 483B         (01579)            MULRR    R3, R4              COMPUTE HALF-WORD DISPLACEMENT
04E03 FC4C0583     (01580)            ADDMR    R4, BCT$BA+HS(R6)   ADD BUFFER BASE ADDRESS
04E05 50287FFF     (01581)            MOVKR    R2, R4, $7FFF        MERGE 15 BIT LLIT FIELD
04E07 2123         (01582)            HOP      #1                  GO MOVE INST. TO SCROLL MEMORY
                   (01583)            EVEN
                   (01584) *
                   (01585) *--- BUFFER SIZE BINDING ---
                   (01586) *
04E08 E04C0605     (01587) IO2$BDR4 MOVMR    R4, BCTSAD+HS(R6)   GET BUFFER SIZE-1
04E0A 2641         (01588)            INCR     R4, 1
04E0B 50287FFF     (01589)            MOVKR    R2, R4, $7FFF       MERGE 15 BIT LLIT FIELD
04E0D 2129         (01590)            HOP      #1                  GO MOVE INSTRUCTION TO SCROLL MEMORY
                   (01591)            EVEN
                   (01592) *
                   (01593) *--- BUFFER SIZE - OFFSET BINDING ---
                   (01594) *
```

```
04F0F F0304F30 (01595) IO2SHDR5 MOVMR    R3, IOBDSOFF          GET OFFSET
04F10 F04C0605 (01596)          MOVMR    R4, BCTSAD+HS(R6)     GET BUFFER SIZE-1
04F12 2641     (01597)          INCR     R4, 1
04F13 4F46     (01598)          SUBRR    R4, R3                SUBTRACT OFFSET
04F14 50287FFF (01599)          MOVKR    R2, R4, $7FFF         MERGE 15 BIT LLIT
04F16 2132     (01600)          HOP      #1
04F17 0800     (01601)          EVEN
               (01602) *
               (01603) *--- OFFSET BINDING ---
               (01604) *
04F18 F0304F30 (01605) IO2SHDR6 MOVMR    R3, IOBDSOFF          GET OFFSET
04F1A 50267FFF (01606)          MOVKR    R2, R3, $7FFF         MERGE 15 BIT LLIT
04F1C 2138     (01607)          HOP      #1                    GO MOVE INSTRUCTION TO SCROLL MEMORY
04F1D 0800     (01608)          EVEN
               (01609) *
               (01610)          EJECT
```

```
04F1E 00080000 (01611) IOBDSLPT ADDR     $10000(R5)         POINTER TO STORE INST IN SCROLL
04F20 000A0000 (01612) IOBDSPPT ADDR     MSS(R5)            POINTER TO GET INST FROM SCROLL PROGRAM
               (01613) *
04F22 00004DDF (01614) I02SBDRD ADDR     I02SBDR0           BINDING DISPATCH TABLE
04F24 00004DFF (01615)          ADDR     I02SBDR1
04F26 00004DFA (01616)          ADDR     I02SBDR2
04F28 00004E00 (01617)          ADDR     I02SBDR3
04F2A 00004E08 (01618)          ADDR     I02SBDR4
04F2C 00004E0F (01619)          ADDR     I02SBDR5
04F2E 00004E18 (01620)          ADDR     I02SBDR6
               (01621) *
04F30 0000     (01622) IOBDSOFF DATA     MSS               OFFSET VALUE
               (01623) *
04F31 0800     (01624)           EVEN
```

```
' ADAMSSSP   MODULE TO PROCESS THE ADAM SIMPLIFIED SAMPLING PLAN
*
*
*
*  FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
*
*
*          !                         !                         !
*   WORD   !        LEFT BYTE        !       RIGHT BYTE        !
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*          !                         !                         !
*    0     !   POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)!
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*          !                         !                         !
*    1     !           73            !       ADAM NUMBER       !
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*          !                         !                         !
*    2     !    LOGICAL BUFFER #1    !    LOGICAL BUFFER #0    !
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*          !                         !                         !
*    3     !       CHANNEL #1        !       CHANNEL #0        !
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*          !                         !                         !
*    4     !               COUNTER VALUE                       !
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*          !                         !                         !
*    5     !    ACQUISITION MODE     ! TRIG. & CLOCK PARAMETERS!
*          !                         !                         !
*   -----!-------------------------!-------------------------!
*
*
*
*
          EJECT
```

```
04F32 F0720002 (01665) ADAM$SSP MOVMR    R7, WS(R1)          FIRST SET SINGLE OR DUAL SAMPLING
04F34 9A70FF00 (01666)          ANDIR    R7, MSKSLBYT
04F36 1A10     (01667)          SKPL     EOZ                 SKIP IF SINGLE CHANNEL
04F37 90700002 (01668)          MOVIR    R7, 2               ELSE, SET DUAL CHANNEL FLAG
               (01669) *
04F39 0800     (01670)          EVEN
04F3A F0220002 (01671)          MOVMR    R2, WS(R1)          GET MUX ADDRESSES
04F3C 9A2000FF (01672)          ANDIR    R2, MSKSRBYT        FIRST MUX ADDRESS TO R3
04F3E 96208000 (01673)          IORIR    R2, $8000           SET ACQUIRE BIT
04F40 F06F4FD0 (01674)          MOVMR    R6, ADMSFMA(R7)     GET POINTER TO FMA IN IOS2 CODE
04F42 F0AF4FCC (01675)          MOVRM    R2, @ADMSSPLN(R7)   STORE FIRST MUX ADDRESS IN IOS2 PROG
04F44 0050     (01676)          CLR      R5                  SET COUNTER FOR TWO PASSES
04F45 0800     (01677)          EVEN
               (01678) *
04F46 F0220001 (01679) ADAM$SS1 MOVMR    R2, HS(R1)          GET LOGICAL BUFFER ID
04F48 0250     (01680)          TEST     R5
04F49 1810     (01681)          SKP      EOZ
04F4A 3C28     (01682)          LRS      R2, 8
               (01683) *
04F4B 4C5F     (01684)          ADDRR    R5, R7              CONSTRUCT POINTER FOR BUFFER 0 OR 1 INFO
04F4C 9A2000FF (01685)          ANDIR    R2, MSKSRBYT
04F4E 4C24     (01686)          ADDRR    R2, R2              CONVERT TO WORD INDEX
04F4F 0800     (01687)          EVEN
04F50 C0340582 (01688)          MOVMRL   R3, BCTSBA(R2)      GET BUFFER START ADDRESS
04F52 9A300007 (01689)          ANDIR    R3, $7              CLEAR OUT UNWANTED BITS
04F54 F06A4FD4 (01690)          MOVMR    R6, ADMSBA(R5)      CONSTRUCT POINTER TO BASE ADDR LOAD INST
04F56 90FF4FCC (01691)          MOVIR    R6, @ADMSSPLN(R7)   GET PNTR TO BASE ADDRESS LOC
04F58 763CFFF0 (01692)          IORWK    R3, R6, $FFF0       CONSTRUCT PROPER BASE ADDRESS INSTRUCTION
04F5A 843C0000 (01693)          MOVRML   R3, 0(R6)           STORE IT IN IOS PROG
04F5C C0340604 (01694)          MOVMRL   R3, BCTSAD(R2)      GET BUFFER SEPARATION AND SIZE
04F5E 2663     (01695)          INCR     R6, WS+HS           STEP TO FIRST SEPARATION LOC
04F5F 0800     (01696)          EVEN
04F60 F03C0000 (01697)          MOVRM    R3, 0(R6)
04F62 F06A4FD8 (01698)          MOVMR    R6, ADMSSEP(R5)     GET POINTER TO SEPERATION INFO
04F64 F0BF4FCC (01699)          MOVRM    R3, @ADMSSPLN(R7)   STORE IT
04F66 0270     (01700)          TEST     R7
04F67 1910     (01701)          SKP      NEZ                 SKIP IF DUAL CHANNEL SAMPLING
04F68 2003     (01702)          HOP      ADAM$SS2
               (01703) *
04F69 2666     (01704)          INCR     R6, 3*WS            POINT TO NEXT LOC FOR SEPERATION
04F6A F0BE4FCC (01705)          MOVRM    R3, @ADMSSPLN(R7)   AND STORE IT
               (01706) *
04F6C 4838     (01707) ADAM$SS2 MULRR    R3, R4              COMPUTE DISPLACEMENT TO BUFFER END
04F6D 3C31     (01708)          LRS      R3, 1
```

```
04F6E FC3405R3 (01709)            ADDMR    R3, BCTSHA+HS(R2)    ADD IN BUFFER BASE ADDRESS
04F70 F06A4FDC (01710)            MOVMR    R6, ADM$BEND(R5)     GET POINTER TO BUF END LOC
04F72 F0BE4FCC (01711)            MOVRM    R3, @ADM$SPLN(R7)    STORE IT IN THE SAMPLING PLAN
04F74 2761     (01712)            DECR     R6, HS               POINT TO FIRST HW OF INST
04F75 0800     (01713)            EVEN
04F76 D0BE4FCC (01714)            CMB      0, @ADM$SPLN(R7)
04F78 DA0405R2 (01715)            SMBCL    0, BCTSHA(R2)
04F7A D2BE4FCC (01716)            SMB      0, @ADM$SPLN(R7)
04F7C 4F5F     (01717)            SUBRR    R5, R7               RESTORE PASS COUNTER
04F7D 0270     (01718)            TEST     R7                   IF DUAL SAMPLING PLAN
04F7E 80104F92 (01719)            JMP      ADAM$SS3, EOZ             (NOT)
               (01720) *
04F80 F06A4FE0 (01721)            MOVMR    R6, ADM$SMA(R5)      SET UP SECOND MUX ADDRESS
04F82 F0220002 (01722)            MOVMR    R2, WS(R1)           GET THE TWO MUX ADDRESSES
04F84 503400FF (01723)            MOVKR    R3, R2, MSK$RBYT     FIRST MUX ADDRESS TO R3
04F86 9A20FF00 (01724)            ANDIR    R2, MSK$LBYT         SECOND MOX ADDRESS TO R2
04F88 3C28     (01725)            LRS      R2, 8
04F89 4F26     (01726)            SUBRR    R2, R3               WANT DISPLACEMENT TO 2ND MUX ADDR
04F8A F0AF4FCC (01727)            MOVRM    R2, @ADM$SPLN(R7)    STORE IN IOS PROG
04F8C 2664     (01728)            INCR     R6, 2*WS             POINT TO NEXT MUX STORAGE LOCATION
04F8D 0820     (01729)            NEG      R2
04F8E 9C200010 (01730)            ADDIR    R2, $10              SET FMA COMP WITH S/H RELEASE
04F90 F0AF4FCC (01731)            MOVRM    R2, @ADM$SPLN(R7)    PUT IN IOS PROGRAM
               (01732) *
04F92 0250     (01733) ADAM$SS3 TEST     R5                   HAS BOTH BUFFER ID'S BEEN PROCESSED
04F93 1810     (01734)            SKPL     NEZ                      (YES)
04F94 88504F46 (01735)            IJP      R5, ADAM$SS1         NO, GO REPEAT FOR SECOND BUFFER
               (01736) *
               (01737) *
               (01738) *  DISTRIBUTE FCB PARAMETERS
               (01739) *
04F96 3602     (01740)            PUSHXIL  R0, R1               SAVE FCB POINTER
04F97 2711     (01741)            DECR     R1, HS               PREPARE FOR POP OPERATIONS
04F98 3014     (01742)            POPXI    R1, R2               GET ADAM NUMBER
04F99 0C60     (01743)            CCR      R6                   PREPARE FOR LOGICAL BUFFER DISPATCH
               (01744)            EVEN
04F9A 9A2000FF (01745)            ANDIR    R2, MSK$RBYT         EXTRACT SCROLL IDENTIFIER
04F9C F0204FF4 (01746)            MOVRM    R2, ADM$DFCB+WS      STORE IN DUMMY FCB
               (01747) *
04F9E F0320001 (01748)            MOVMR    R3, 1(R1)            EXTRACT BID 0
04FA0 504600FF (01749)            MOVKR    R4, R3, MSK$RBYT
04FA2 F0CF4FCC (01750)            MOVRM    R4, @ADM$SPLN(R7)    PUT INTO SCROLL HEADER
               (01751) *
04FA4 3C38     (01752)            LRS      R3, 8                EXTRACT BID 1
```

ADAMSSSP MODULE TO PROCESS THE ADAM SIMPLIFIED SAMPLING PLAN

```
04FA5 2761      (01753)    DECR    R6, 1              POINT TO IOS SIZE
04FA6 F0FF4FCC  (01754)    MOVRR   R6, @ADMSSPLN(R7)  GET IOS SIZE
04FA8 2662      (01755)    INCR    R6, 2              POINT TO SLOT IN LDS BUFFER FOR ACQ. MODE
04FA9 F0BF3FCC  (01756)    MOVRM   R3, @ADMSSPLN(R7)  STORE BID 1 AS 'BID 2' FOR LDS
                (01757) *
04FAB 2612      (01758)    INCR    R1, 2
04FAC 90600002  (01759)    MOVIR   R6, 2              POINT TO 1ST ADAM CONTROL REGISTER
04FAE 9C25FFE0  (01760)    ADDIR   R2, -32(R2)        CONVERT ADAM DISPLACEMENT TO INDEX
04FB0 C8944D30  (01761)    POPMI   R1, @RNSSIOS2(R2)  STORE ADAM COUNTER IN SCROLL REGISTER
04FB2 3018      (01762)    POPXI   R1, R4             GET ACQUIS. MODE: TRIG/CLK PAR
04FB3 503800FF  (01763)    MOVKR   R3, R4, MSKSRBYT   EXTRACT TRIG/CLK SETTINGS
04FB5 2662      (01764)    INCR    R6, 2
04FB6 F0B44D30  (01765)    MOVRM   R3, @RNSSIOS2(R2)  STORE IN SCROLL REG 2
04FB8 0D60      (01766)    CLR     R6                 SET-UP FOR LATER ADDRESS FETCH
04FB9 0800      (01767)    EVEN
                (01768) *
04FBA 3C48      (01769)    LRS     R4, 8              EXTRACT ACQUISTION MODE
04FBB 90104FF3  (01770)    MOVIR   R1, ADMSDFCB+HS    POINT TO START OF DUMMY FCB
04FBD FCFF4FCC  (01771)    MOVAR   R3, @ADMSSPLN(R7)  POINT TO START OF SCROLL PROGRAM
04FBF 9E300002  (01772)    SUBIR   R3, WS             LOAD SCROLL WANTS POINTER TO SIZE
                (01773) *
04FC1 6026      (01774)    MOVWR   R2, R3             PUT ACQUISITION MODE
04FC2 4C26      (01775)    ADDRR   R2, R3             IN TRAILER ( BA+N+3 )
04FC3 F0440003  (01776)    MOVRM   R4, 3(R2)
04FC5 86004BA2  (01777)    CALL    R0, LDSSADAM       LOAD THE ADAM SCROLL
04FC7 86004CF4  (01778)    CALL    R0, RNSS           EXECUTE SCROLL PROGRAM
                (01779) *
04FC9 3302      (01780)    POPXDL  R0, R1             RESTORE SAVED FCB POINTER
04FCA 0F70      (01781)    RETURN                     AND EXIT
04FCB 0800      (01782)    EVEN
                (01783) *
```

```
                    (01784) *             TABLES FOR ADAM CODE SET-UP
                    (01785) *
                    (01786) *
                    (01787)          EVEN
                    (01788) *
                    (01789) *
04FCC 001C4FEA      (01790) ADM$SPLN ADDR     ADAMSSCS(R6,1)          POINTER TO SINGLE CHANNEL PLAN
04FCE 001C4F30      (01791)          ADDR     ADAMSDCS(R6,1)          POINTER TO DUAL CHANNEL PLAN
                    (01792) *
04FD0 0003          (01793) ADM$SFMA DATA     ASCSFMA*WS + HS, 0
04FD1 0000
04FD2 0003          (01794)          DATA     ADCSFMA*WS + HS, 0
04FD3 0000
                    (01795) *
04FD4 0008          (01796) ADM$HA   DATA     ASCSH1AD*WS
04FD5 001E          (01797)          DATA     ASCSH2AD*WS
04FD6 0008          (01798)          DATA     ADCSH1AD*WS
04FD7 0022          (01799)          DATA     ADCSH2AD*WS
                    (01800) *
04FD8 0011          (01801) ADM$SEP  DATA     ASCSH1SP*WS +HS
04FD9 0027          (01802)          DATA     ASCSH2SP*WS +HS
04FDA 000F          (01803)          DATA     ADCSH1SP*WS +HS
04FDB 0029          (01804)          DATA     ADCSH2SP*WS +HS
                    (01805) *
04FDC 0013          (01806) ADM$HEND DATA     ASCSH1ND*WS + HS
04FDD 0029          (01807)          DATA     ASCSH2ND*WS + HS
04FDE 0017          (01808)          DATA     ADCSH1ND*WS + HS
04FDF 0031          (01809)          DATA     ADCSH2ND*WS + HS
                    (01810) *
04FE0 0000          (01811) ADM$SMA  DATA     ADCSSMA1*WS + HS
04FE1 0027          (01812)          DATA     ADCSSMA2*WS + HS
                    (01813) *
04FE2 0000          (01814) ADM$DFCB DATA     0                       DUMMY FCB FOR LOAD/RUN SCROLL CALLS
04FE3 0000          (01815)          DATA     0                       DUMMY FCB NUMBER
04FE4 0000          (01816)          DATA     0                       SCROLL NUMBER
04FE5 0002          (01817)          DATA     2                       SCROLL TYPE = IOS2
04FE6 0000          (01818)          DATA     0                       LITERAL START VALUE
04FE7 0000          (01819)          DATA     0
```

```
                  (01820) *            ADAM PROGRAM TO SUPPORT SINGLE CHANNEL SAMPLING
                  (01821) *
                  (01822) *
                  (01823)         EVEN
                  (01824) *
                  (01825) *
    04FF8 003A    (01826)         DATA     ASCSSIZE*WS, 0         SCROLL SIZE IN HW : LOGICAL BID 1:0
    04FF9 0000
                  (01827) *
                  (01828) *
                  (01829) ADAMSSCS BEGIN IOS2(ADAMSSCS)           ADAM PROGRAM FOR SINGLE CHANNEL SAMPLING
                  (01830) *
                  (01831)         OPADD    SYNCSTOP, (6 .LS. 10) + (26 .LS. 5) + 4
                  (01832) *
                  (01833) *
A00 04FFA 01300600 (01834)         PR                              SET SCROLL TO READ FROM PERIPHERAL
A01 04FFC 02400000 (01835) ASCSFMA  LOAD(R1, MSS)                  R1 = FIRST MUX ADDRESS
A02 04FFE 03590000 (01836)         ADD(R1, 0, TP)                  SEND INITIAL MUX ADDRESS
A03 04FF0 04300100 (01837)         SET                             START ACQUISITION
                  (01838) *
A04 04FF2 05000000 (01839) ASCSB1AD LOAD(R0, MSS)                  R0 = BUFFER ONE START ADDRESS-SEP
A05 04FF4 06100000 (01840)         SUB(R0, MSS)
                  (01841) *
A06 04FF6 07590010 (01842) *1       ADD(R1,$10,TP)                  RELEASE SAMPLE HOLDS
A07 04FF8 08500010 (01843)         SUB(R1, $10)
A08 04FFA 091A0000 (01844) ASCSB1SP ADD(R0, MSS, TM)               ACQUIRE SAMPLE
A09 04FFC 0A280000 (01845) ASCSB1ND JNE(*1, R0, MSS)               IF END OF BLOCK
                  (01846) *
A0B 04F00 0C302000 (01847)         INT1                            INTERRUPT CSPU
A0C 04F02 0F341000 (01848)         SKIPC(SYNCSTOP)                 STOP PROGRAM AT CSPU REQUEST
A0D 04F04 00000000
A0F 04F06 18300400 (01849)         JUMP(ASCSSTOP)
                  (01850) *
A0F 04F08 10000000 (01851) ASCSB2AD LOAD(R0, MSS)                  R0 = BUFFER TWO START ADDRESS-SEP
A10 04F0A 11100000 (01852)         SUB(R0, MSS)
                  (01853) *
A11 04F0C 12590010 (01854) *2       ADD(R1, $10, TP)                SEND NEXT MUX ADDRESS
A12 04F0F 13500010 (01855)         SUB(R1, $10)
A13 04F10 141A0000 (01856) ASCSB2SP ADD(R0, MSS, TM)               ACQUIRE SAMPLE
A14 04F12 16280000 (01857) ASCSB2ND JNE(*2, R0, MSS)               IF END OF BLOCK
A15 04F14 00000000
                  (01858) *
A17 04F18 18302000 (01859)         INT1                            INTERRUPT CSPU
A18 04F1A 18301000 (01860)         SKIPS(SYNCSTOP)                 STOP PROGRAM AT CSPU REQUEST
```

```
A19 04F1C 00000000
A1A 04F1E 04300000 (01861)          JUMP(ASC$B1AD)              ELSE, CONTINUE SAMPLING
                   (01862) *
A1B 04F20 1C300180 (01863) ASC$STOP CE1                         TURN ACQUISITION OFF
A1C 04F22 1D306400 (01864)          STOP                        THEN STOP THE SCROLL
                   (01865) *
          0000001D (01866) ASC$SIZE = #A
                   (01867) *
    04F24          (01868)          END
                   (01869) *
                   (01870) *  SET UP TRAILER INFORMATION
                   (01871) *
    04F24 0002     (01872)          DATA     2                  SET TRANSFER DIRECTION TO WRITE
    04F25 0000     (01873)          DATA     0                  # CHANNELS : ACQUISITION MODE
    04F26 0000     (01874)          DATA     0                  BID 3 : 2
    04F27 0000     (01875)          DATA     0                  # SCROLL REGISTERS TO LOAD
    04F28 0000     (01876)          DATA     0                  1ST SCROLL REGISTER TO LOAD
    04F29 FFFF     (01877)          DATA     -1                 INTEGER SCALAR ID OF OFFSET = NULL
    04F2A FFFF     (01878)          DATA     -1,-1,-1,-1        BINDING CHAIN ANCHORS = NULL
    04F2B FFFF
    04F2C FFFF
    04F2D FFFF
                   (01879)          EVEN
```

```
                        (01880) *            ADAM PROGRAM TO SUPPORT DUAL CHANNEL SAMPLING
                        (01881) *
                        (01882) *
    04F2E 0042          (01883)           DATA    ADCSSIZE*WS,  0          MODULE SIZE IN HW : LOGICAL BID 1:0
    04F2F 0000
                        (01884) *
                        (01885) ADAMSDCS BEGIN IOS2(ADAMSDCS)         ADAM PROGRAM FOR DUAL CHANNEL SAMPLING
                        (01886) *
                        (01887) *
A00 04F30 01300600 (01888)           PR                           SET TO READ FROM PERIPHERAL
A01 04F32 02400000 (01889) ADCSFMA   LOAD(R1, MSS)                R1 = FIRST MUX ADDRESS
A02 04F34 03590000 (01890)           ADD(R1, 0, TP)               SEND INITIAL MUX ADDRESS
A03 04F36 04300100 (01891)           SFI                          START ACQUISITION
                   (01892) *
A04 04F38 05000000 (01893) ADCSB1AD LOAD(R0, MSS)                 R0 = BUFFER ONE START ADDRESS-SEP
A05 04F3A 06100000 (01894)           SUB(R0, MSS)
                   (01895) *
                   (01896) #1
A06 04F3C 07590000 (01897) ADCSSMA1 ADD(R1, MSS, TP)              SEND SECOND CHANNEL ADDRESS
A07 04F3E 081A0000 (01898) ADCSB1SP ADD(R0, MSS, TM)              ACQUIRE SAMPLE
A08 04F40 09590000 (01899)           ADD(R1, MSS, TP)             SEND FIRST MUX ADDR : RELEASE S/H
A09 04F42 0A500010 (01900)           SUB(R1, $10)
A0A 04F44 0B1A0000 (01901)           ADD(R0, MSS, TM)             ACQUIRE SAMPLE
A0B 04F46 0C280000 (01902) ADCSB1ND JNE(#1, R0, MSS)              IF END OF BLOCK
                   (01903) *
A0D 04F4A 0F302000 (01904)           INT1                         INTERRUPT THE CSPU
A0E 04F4C 10341000 (01905)           SKIPC(SYNCSTOP)              STOP PROGRAM AT CSPU REQUEST
A0F 04F4E 00000000
A10 04F50 1F300400 (01906)           JUMP(ADCSSTOP)
                   (01907) *
A11 04F52 12000000 (01908) ADCSB2AD LOAD(R0, MSS)                 R0 = BUFFER TWO START ADDRESS-SEP
A12 04F54 13100000 (01909)           SUB(R0, MSS)
                   (01910) *
                   (01911) #2
A13 04F56 14590000 (01912) ADCSSMA2 ADD(R1, MSS, TP)              SEND SECOND CHANNEL ADDRESS
A14 04F58 151A0000 (01913) ADCSB2SP ADD(R0, MSS, TM)              ACQUIRE SAMPLE
A15 04F5A 16590000 (01914)           ADD(R1, MSS, TP)             SEND FIRST MUX ADDR : RELEASE S/H
A16 04F5C 17500010 (01915)           SUB(R1, $10)
A17 04F5E 181A0000 (01916)           ADD(R0, MSS, TM)             ACQUIRE SAMPLE
A18 04F60 1A280000 (01917) ADCSB2ND JNE(#2, R0, MSS)              IF END OF BLOCK
A19 04F62 00000000
                   (01918) *
A1B 04F66 1C302000 (01919)           INT1                         INTERRUPT CSPU
A1C 04F68 1F301000 (01920)           SKIPS(SYNCSTOP)              STOP PROGRAM AT CSPU REQUEST
```

```
 A1D 04F6A 00000000
 A1E 04F6C 04300000 (01921)          JUMP(ADCSBIAD)                ELSE, CONTINUE SAMPLING
                    (01922) *
 A1F 04F6E 20300180 (01923) ADCSSTOP   CF1                          FIRST TURN OFF ACQUISITION
 A20 04F70 21306400 (01924)            STOP                         THEN STOP THE SCROLL
           00000021 (01925) ADCSSIZE = *A
                    (01926) *
     04F72          (01927)          END
                    (01928) *
                    (01929) *  SET UP TRAILER INFORMATION
                    (01930) *
     04F72 0002     (01931)          DATA     2                     SET TRANSFER DIRECTION TO WRITE
     04F73 0000     (01932)          DATA     0                     # CHANNELS : ACQUISITION MODE
     04F74 0000     (01933)          DATA     0                     BID 3 : 2
     04F75 0000     (01934)          DATA     0                     # SCROLL REGISTERS TO LOAD
     04F76 0000     (01935)          DATA     0                     1ST SCROLL REGISTER TO LOAD
     04F77 FFFF     (01936)          DATA     -1                    INTEGER SCALAR ID OF OFFSET = NULL
     04F78 FFFF     (01937)          DATA     -1,-1,-1,-1           BINDING CHAIN ANCHORS = NULL
     04F79 FFFF
     04F7A FFFF
     04F7B FFFF
                    (01938)          EVEN
```

```
' ADAMS16S - MODULE TO PROCESS THE 16 CHANNEL ADAM SIMP, SAMP, FCB
*
*   FCB FORMAT  (16 BIT WORD FORMAT SHOWN)
*
*
*          !                         !                         !
*    WORD  !       LEFT BYTE         !       RIGHT BYTE        !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                                                   !
*     0    ! POINTER TO NEXT FCB AND FUNCTION LIST FLAG (LSB)  !
*          !                                                   !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*     1    !          74             !      ADAM NUMBER        !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*     2    !   LOGICAL BUFFER #1     !   LOGICAL BUFFER #0     !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*     3    !           0             !            0            !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*          !                                                   !
*     4    !                  COUNTER VALUE                    !
*          !                                                   !
*   -------!-------------------------!-------------------------!
*          !                         !                         !
*     5    !   ACQUISITION MODE      ! TRIG. & CLOCK PARAMETER !
*          !                         !                         !
*   -------!-------------------------!-------------------------!
*
*
*
*
         EJECT
```

```
04F7C F0220001 (01977) ADAMS16S MOVMR  R2, HS(R1)          GET BUFFER IDS
04F7E 9A2000FF (01978)          ANDIR  R2, MSKSRBYT        GET BUFFER ID#0
04F80 4C24     (01979)          ADDRR  R2, R2              CONVERT TO BCT INDEX
04F81 0800     (01980)          EVEN
04F82 C0340582 (01981)          MOVMRL R3, BCTSBA(R2)      GET BUFFER BUS NUMBER AND BASE ADDRESS
04F84 9A300006 (01982)          ANDIR  R3, $6              CLEAR OUT UNWANTED BITS
04F86 90604FE8 (01983)          MOVIR  R6, A16SB1D         GET LOC. OF PNTR TO BASE ADDR INST.
04F88 763CFFF0 (01984)          IORWK  R3, R6, $FFF0       CONSTRUCT PROPER FORMAT TO BASE ADDR INST.
04F8A 843C0000 (01985)          MOVRML R3, 0(R6)           STORE IN IOS PROG.
04F8C C0340604 (01986)          MOVMRL R3, BCTSAD(R2)      GET BUFFER SEPERATION AND SIZE
04F8E 2663     (01987)          INCR   R6, $3              STEP TO SEPERATION LOC IN IOS PROG.
04F8F 0800     (01988)          EVEN
04F90 F03C0000 (01989)          MOVRM  R3, 0(R6)           STORE IN IOS PROG.
04F92 4838     (01990)          MULRR  R3, R4              COMPUTE DISPLACEMENT TO BUFFER END LOC.
04F93 3C31     (01991)          LRS    R3, $1              GET BASE ADDR. IN PROPER IOS FMT.
04F94 FC340583 (01992)          ADDMR  R3, BCTSBA+HS(R2)   ADD IN BASE ADDRESS TO YIELD BUFFER END
04F96 F030503F (01993)          MOVRM  R3, A16SB1F+HS      STORE IN IOS PROG.
               (01994) *
04F98 F0220001 (01995)          MOVMR  R2, HS(R1)          GET BUFFER IDS
04F9A 9A20FF00 (01996)          ANDIR  R2, MSKSLBYT        GET BUFFER ID #1
04F9C 0220     (01997)          TEST   R2                  SEE IF BUFFER IS USED
04F9D 80104FBB (01998)          JMP    ADMSC0, EQZ
               (01999) *
04F9F 3C28     (02000)          LRS    R2, $8              GET BUFFER ID IN PROPER FORMAT
04FA0 4C24     (02001)          ADDRR  R2, R2              IT IS, SO CONVERT TO BCT INDEX
04FA1 0800     (02002)          EVEN
04FA2 C0340582 (02003)          MOVMRL R3, BCTSBA(R2)      GET BUFFER BUS NUMBER AND BASE ADDR.
04FA4 9A300006 (02004)          ANDIR  R3, $6              CLEAR OUT UNWANTED BITS
04FA6 9060504C (02005)          MOVIR  R6, A16SB2D         GET LOC. OF POINTER TO BASE ADDR. INST.
04FA8 763CFFF0 (02006)          IORWK  R3, R6, $FFF0       CONSTRUCT PROPER FORMAT FOR BASE ADDR.
04FAA 843C0000 (02007)          MOVRML R3, 0(R6)           STORE IN IOS PROG.
04FAC C0340604 (02008)          MOVMRL R3, BCTSAD(R2)      GET BUFFER SEPERATION AND SIZE
04FAE 2663     (02009)          INCR   R6, $3              STEP TO SEPERATION LOC IN IOS PROG.
04FAF 0800     (02010)          EVEN
04FB0 F03C0000 (02011)          MOVRM  R3, 0(R6)           STORE IN IOS PROG.
04FB2 4838     (02012)          MULRR  R3, R4              COMPUTE DISPLACEMENT TO BUFFER END.
04FB3 3C31     (02013)          LRS    R3, $1              PUT BASE ADDR. IN PROPER IOS FMT.
04FB4 FC340583 (02014)          ADDMR  R3, BCTSBA+HS(R2)   ADD IN BASE ADDRESS TO YIELD BUFFER END
04FB6 F0305093 (02015)          MOVRM  R3, A16SB2F+HS      STORE IN IOS PROG.
               (02016) *
               (02017) *
               (02018) * DISTRIBUTE FCB PARAMETERS
               (02019) *
               (02020) *
```

```
04FB8 3602     (02021) ADMSCO  PUSHXIL R0, R1             SAVE FCB POINTER
04FB9 2711     (02022)         DECR    R1, HS             PREPARE FOR POP OPERATIONS
04FBA 3014     (02023)         POPXI   R1, R2             GET ADAM NUMBER
04FBB 0800     (02024)         EVEN
04FBC 9A2000FF (02025)         ANDIR   R2, MSKSRBYT       EXTRACT SCROLL IDENTIFIER
04FBE F0204FF4 (02026)         MOVRM   R2, ADMSDFCB+WS    STORE IN DUMMY FCB
               (02027) *
04FC0 F0320001 (02028)         MOVMR   R3, 1(R1)            GET BID 0
04FC2 504600FF (02029)         MOVKR   R4, R3, MSKSRBYT
04FC4 F0404FED (02030)         MOVRM   R4, ADM$16C-HS       STORE IN IOS HEADER
               (02031) *
04FC6 3C38     (02032)         LRS     R3, 8                GET BID 1
04FC7 90404FFF (02033)         MOVIR   R4, ADM$16C          COMPUTE POINTER TO 'BID 2'
04FC9 FC404FFC (02034)         ADDMR   R4, ADM$16C-2        IN SCROLL BUFFER AREA
04FCB F0380002 (02035)         MOVRM   R3, 2(R4)
               (02036) *
04FCD 2612     (02037)         INCR    R1, 2
04FCE 90600002 (02038)         MOVIR   R6, 2                POINT TO 1ST ADAM CONTROL REGISTER
04FD0 9C25FFE0 (02039)         ADDIR   R2, -32(R2)        CONVERT ADAM DISPLACEMENT TO INDEX
04FD2 C8944D30 (02040)         POPMI   R1, @RNS$IOS2(R2)  STORE ADAM COUNTER IN SCROLL REGISTER 1
               (02041) *
04FD4 3018     (02042)         POPXI   R1, R4             GET ACQUIS. MODE : TRIG/CLK PARA.
04FD5 503800FF (02043)         MOVKR   R3, R4, MSKSRBYT   EXTRACT TRIG. & CLOCK SETTINGS
04FD7 2662     (02044)         INCR    R6, 2
04FD8 F0844D30 (02045)         MOVRM   R3, @RNS$IOS2(R2)  STORE IN SCROLL REG 2
               (02046)         EVEN
04FDA 3C48     (02047)         LRS     R4, 8                EXTRACT ACQUISITION MODE
04FDB 90104FF3 (02048)         MOVIR   R1, ADMSDFCB+HS    POINT TO START OF DUMMY FCB
04FDD FC304FFF (02049)         MOVAR   R3, ADM$16C        POINT TO START OF SCROLL PROG.
04FDF 9F300002 (02050)         SUBIR   R3, WS             LOAD SCROLL  (R3 = START OF SCROLL BUFFER)
               (02051) *
04FE1 6026     (02052)         MOVWR   R2, R3               PUT ACQUISITION MODE IN SCROLL BUFFER
04FE2 4C26     (02053)         ADDRR   R2, R3               ( BA+N+3 )
04FE3 F0440003 (02054)         MOVRM   R4, 3(R2)
               (02055) *
04FE5 86004BA2 (02056)         CALL    R0, LDSSADAM       LOAD THE ADAM WITH THE SCROLL PROGRAM
04FE7 86004CF4 (02057)         CALL    R0, RNS$             EXECUTE SCROLL PROGRAM
               (02058) *
04FE9 3302     (02059)         POPXDL  R0, R1             RESTORE SAVED FCB POINTER
04FEA 0F70     (02060)         RETURN                     AND EXIT
04FEB 0800     (02061)         EVEN
```

```
                        (02062) *            ADAM PROGRAM TO SUPPORT 16 CHANNEL SAMPLING
                        (02063) *
                        (02064) *
      04FFC 0088        (02065)          DATA    A16SSIZ*WS, 0    MODULE SIZE IN HALF-WORDS : LOGICAL RID'S
      04FFD 0000
                        (02066) *
                        (02067) ADMS16C BEGIN   IOS2(ADMS16C)    ADAM PROGRAM FOR 16 CHANNEL SAMPLING
                        (02068) *
                        (02069)          OPADD   SYNCSTOP, (6 .LS. 10) + (26 .LS. 5) + 4
                        (02070) *
 A00 04FFF 01300600     (02071)          ER                       SET TO READ FROM ADAM
           00004FF0     (02072)          A16SEMA=*L
 A01 04FF0 02408000     (02073)          LOAD    (R1, $8000)      SET ADAM REGISTER #1 TO READ FROM CHANNEL #00
 A02 04FF2 03590000     (02074)          ADD     (R1, 0, TP)      ACTIVATE CHANNEL #00
 A03 04FF4 04300100     (02075)          SE1                      ENABLE ADAM DATA ACQUISITION
 A04 04FF6 05300700     (02076)          SE2
                        (02077) *
           00004FF8     (02078)          A16SR1D=*L
 A05 04FF8 06000000     (02079) A16SR1A LOAD    (R0, MSS)        SET R0 TO CONTAIN THE MAP BUFFER MEMORY ADDR.,
 A06 04FFA 07100000     (02080)          SUB     (R0, MSS)        AND SEPARATION.
                        (02081) *
                        (02082) *1
 A07 04FFC 08590001     (02083)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #01
 A08 04FFE 091A0001     (02084)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #00 INTO MAP MEMORY
 A09 05000 0A590001     (02085)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #02
 A0A 05002 0B1A0001     (02086)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #01 INTO MAP MEMORY
 A0B 05004 0C590001     (02087)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #03
 A0C 05006 0D1A0001     (02088)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #02 INTO MAP MEMORY
 A0D 05008 0E590001     (02089)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #04
 A0E 0500A 0F1A0001     (02090)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #03 INTO MAP MEMORY
 A0F 0500C 10590001     (02091)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #05
 A10 0500E 111A0001     (02092)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #04 INTO MAP MEMORY
 A11 05010 12590001     (02093)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #06
 A12 05012 131A0001     (02094)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #05 INTO MAP MEMORY
 A13 05014 14590001     (02095)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #07
 A14 05016 151A0001     (02096)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #06 INTO MAP MEMORY
 A15 05018 16590001     (02097)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #08
 A16 0501A 171A0001     (02098)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #07 INTO MAP MEMORY
 A17 0501C 18590001     (02099)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #09
 A18 0501E 191A0001     (02100)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #08 INTO MAP MEMORY
 A19 05020 1A590001     (02101)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #10
 A1A 05022 1B1A0001     (02102)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #09 INTO MAP MEMORY
 A1B 05024 1C590001     (02103)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #11
 A1C 05026 1D1A0001     (02104)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #10 INTO MAP MEMORY
```

```
A1D 05028 1E590001 (02105)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #12
A1E 0502A 1F1A0001 (02106)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #11 INTO MAP MEMORY
A1F 0502C 20590001 (02107)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #13
A20 0502E 211A0001 (02108)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #12 INTO MAP MEMORY
A21 05030 22590001 (02109)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #14
A22 05032 231A0001 (02110)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #13 INTO MAP MEMORY
A23 05034 24590001 (02111)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #15
A24 05036 251A0001 (02112)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #14 INTO MAP MEMORY
A25 05038 26590021 (02113)         ADD     (R1, S21, TP)    SET CHANNEL # TO 00 AND ACTIVATE
A26 0503A 271A0001 (02114)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #15 INTO MAP MEMORY
                   (02115) *
A27 0503C 28500030 (02116)         SUB     (R1, S30)        RESET S/H
                   (02117) *
          0000503E (02118)         A16SH1E=#L
A28 0503E 2A280000 (02119)         JNE     (#1, R0, MSS)    LOOP AGAIN IF BUFFER NOT FILLED
A29 05040 00000000
                   (02120) *
A2B 05044 2C302000 (02121)         INT1                     OTHERWIZE, INTERRUPT THE CSPU
A2C 05046 2E341000 (02122)         SKIPC   (SYNCSTOP)       AND STOP THE PROGRAM AT THE CSPU'S REQUEST
A2D 05048 00000000
A2E 0504A 59300400 (02123)         JUMP    (A16SSTOP)
                   (02124) *
                   (02125) * OTHERWISE CONTINUE SAMPLING INTO THE SECOND BUFFER
                   (02126) *
          0000504C (02127)         A16SH2D=#L
A2F 0504C 30000000 (02128)         LOAD    (R0, MSS)        SET R0 TO CONTAIN THE SECOND MEMORY ADDR.,
A30 0504E 31100000 (02129)         SUB     (R0, MSS)        AND SEPARATION.
                   (02130) *
                   (02131) #2
A31 05050 32590001 (02132)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #01
A32 05052 331A0001 (02133)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #00 INTO MAP MEMORY
A33 05054 34590001 (02134)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #02
A34 05056 351A0001 (02135)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #01 INTO MAP MEMORY
A35 05058 36590001 (02136)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #03
A36 0505A 371A0001 (02137)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #02 INTO MAP MEMORY
A37 0505C 38590001 (02138)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #04
A38 0505E 391A0001 (02139)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #03 INTO MAP MEMORY
A39 05060 3A590001 (02140)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #05
A3A 05062 3B1A0001 (02141)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #04 INTO MAP MEMORY
A3B 05064 3C590001 (02142)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #06
A3C 05066 3D1A0001 (02143)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #05 INTO MAP MEMORY
A3D 05068 3E590001 (02144)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #07
A3E 0506A 3F1A0001 (02145)         ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #06 INTO MAP MEMORY
A3F 0506C 40590001 (02146)         ADD     (R1, 1, TP)      ACTIVATE CHANNEL #08
```

```
A40 0506E 411A0001 (02147)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #07 INTO MAP MEMORY
A41 05070 42590001 (02148)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #09
A42 05072 431A0001 (02149)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #08 INTO MAP MEMORY
A43 05074 44590001 (02150)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #10
A44 05076 451A0001 (02151)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #09 INTO MAP MEMORY
A45 05078 46590001 (02152)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #11
A46 0507A 471A0001 (02153)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #10 INTO MAP MEMORY
A47 0507C 48590001 (02154)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #12
A48 0507E 491A0001 (02155)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #11 INTO MAP MEMORY
A49 05080 4A590001 (02156)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #13
A4A 05082 4B1A0001 (02157)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #12 INTO MAP MEMORY
A4B 05084 4C590001 (02158)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #14
A4C 05086 4D1A0001 (02159)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #13 INTO MAP MEMORY
A4D 05088 4E590001 (02160)          ADD     (R1, 1, TP)      ACTIVATE CHANNEL #15
A4E 0508A 4F1A0001 (02161)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #14 INTO MAP MEMORY
A4F 0508C 50590021 (02162)          ADD     (R1, $21, TP)    SET CHANNEL # TO 00 AND ACTIVATE
A50 0508E 511A0001 (02163)          ADD     (R0, 1, TM)      PUT DATA FROM CHANNEL #15 INTO MAP MEMORY
                   (02164) *
A51 05090 52500030 (02165)          SUB     (R1, $30)        RESET S/H
                   (02166) *
          00005092 (02167)          A16$B2F=#L
A52 05092 54280000 (02168)          JNE     (#2, R0, M$$)    LOOP AGAIN IF BUFFER NOT FILLED
A53 05094 00000000
                   (02169) *
A55 05098 56302000 (02170)          INT1                     OTHERWISE, INTERRUPT THE CSPU
A56 0509A 58301000 (02171)          SKIPS   (SYNCSTOP)       AND STOP THE PROGRAM AT THE CSPU'S REQUEST
A57 0509C 00000000
A58 0509E 05300400 (02172)          JUMP    (A16$H1A)        ELSE, CONTINUE SAMPLING
                   (02173) *
A59 050A0 5A300180 (02174) A16$STOP CF1                      TURN OFF ACQUISITION OF ADAM
A5A 050A2 5B300780 (02175)           CF2
A5B 050A4 5C306000 (02176)          STOP                     THEN STOP THE SCROLL
                   (02177) *
          0000005C (02178) A16$SIZ = #A
                   (02179) *
    050A6          (02180)          END
                   (02181) *
                   (02182) *  SET UP TRAILER INFORMATION
                   (02183) *
    050A6 0002     (02184)           DATA     2                  SET TRANSFER DIRECTION TO WRITE
    050A7 0000     (02185)           DATA     0                  # CHANNELS : ACQUISITION MODE
    050A8 0000     (02186)           DATA     0                  RIO 3 : 2
    050A9 0000     (02187)           DATA     0                  # SCROLL REGISTERS TO LOAD
    050AA 0000     (02188)           DATA     0                  1ST SCROLL REGISTER TO LOAD
```

```
050AB FFFF     (02189)        DATA    -1                  INTEGER SCALAR ID OF OFFSET = NULL
050AC FFFF     (02190)        DATA    -1,-1,-1,-1         BINDING CHAIN ANCHORS = NULL
050AD FFFF
050AE FFFF
050AF FFFF
```

```
          * ADMRB      MODULE TO PROCESS ADAM ROTATE BUFFER FCB
          *
          *
00000003           $M = 3                          SET TO MAP-300 ASSEMBLY
          *
                   OPADD TABS,(1 .LS. 14) + 19     DEFINE TAB PSEUDO OP
          *
          *
          * FCB FORMAT   (16 BIT WORD FORMAT SHOWN)
          *
          *
          *        !                        !                         !
          *  WORD  !        LEFT BYTE       !       RIGHT BYTE        !
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
          *        !                        !                         !
          *    0   !  POINTER TO NEXT FCB AND FUNCTION LIST FLAG(LSB)!
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
          *        !                        !                         !
          *    1   !          229           !                         !
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
          *        !                        !                         !
          *    2   !          YBUF          !          ISA            !
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
          *        !                        !                         !
          *    3   !          UBUF          !                         !
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
          *        !                        !                         !
          *    4   !           0            !           0             !
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
          *        !                        !                         !
          *    5   !           0            !           0             !
          *        !                        !                         !
          *  ------!------------------------!-------------------------!
```

```
                (02230) *       SPECIAL BINDING MODULE FOR ROTATE ADAM BUFFER
                (02231) *
                (02232) *  THE INPUT BUFFER 'U' IS SEPARATED INTO TWO 'BUFFERS'
                (02233) *  A AND B, WHERE
                (02234) *
                (02235) *        A = 'BUFFER' STARTING WITH THE TRIGGER ADDRESS + 1
                (02236) *            AND EXTENDING TO THE LAST SAMPLE OF THE U BUFFER
                (02237) *
                (02238) *        B = 'BUFFER' STARTING WITH THE FIRST SAMPLE OF THE
                (02239) *            U BUFFER AND EXTENDING TO THE SAMPLE INCLUDING THE
                (02240) *            TRIGGER ADDRESS
                (02241) *
                (02242) *  THIS SPECIAL SUPPORT MODULE EXTRACTS THE TRIGGER ADDRESS
                (02243) *  FROM A PAIR OF CONSECUTIVE INTEGER SCALARS AND BINDS
                (02244) *  THE PERTINENT INFORMATION FOR 'BUFFERS' A AND B INTO THE
                (02245) *  APS MODULE
                (02246) *
                (02247) *
050B0 86100FFA (02248) ADMRBS   CALL     R1, APSBNDR          PERFORM STANDARD BINDING FIRST
                (02249) *
                (02250) *     REG. 3 = HIGH ORDER BIT OF TRIGGER ADDRESS
                (02251) *     REG. 4 = LOW ORDER 16 BITS OF TRIGGER ADDRESS
                (02252) *
050B2 F0720001 (02253)          MOVMR    R7, 1(R1)            INTEGER SCALAR 'A' ID
050B4 9A7000FF (02254)          ANDIR    R7, MSK$RBYT
                (02255) *
050B6 C03E0502 (02256)          MOVMRL   R3, ISVTS(R7)        GET TRIGGER VALUE
                (02257) *
050B8 2641     (02258)          INCR     R4, 1                ADJUST TO 'ABASE'
050B9 81405080 (02259)          JMP      ADMRBS0, NCRY        IF CARRY,
050BB D2000003 (02260)          SMB      0, R3                SET BIT 17 IN ADDRESS
                (02261) *
050BD E0405159 (02262) ADMRBS0  MOVRM    R4, RBABAS+1         PUT TRIGGER ADDRESS IN APS
050BF F0505158 (02263)          MOVMR    R5, RBABAS           PICK UP 'ABASE' INSTRUCTION
050C1 56560001 (02264)          IORRR    R5, R3, 1            GET HIGH ORDER BIT
050C3 E0505158 (02265)          MOVRM    R5, RBABAS           STORE IN CONSTRUCTED BLOCK
                (02266) *
050C5 D2305158 (02267)          SMB      3, RBABAS            SET SHORT BIT IN LOAD INSTRUCTIONS
050C7 D2305156 (02268)          SMB      3, RBABAS-2
050C9 D2305150 (02269)          SMB      3, RBABAS-8
                (02270) *
050CB 3E31     (02271)          ROR      R3, 1                MOVE HIGH ORDER ADDRESS BIT TO POS 17
050CC 563BFFFF (02272)          IORRR    R3, R4, $FFFF        CONCATENATE BIT 17 WITH ADDRESS
                (02273) *
```

```
050CF F0220002 (02274)          MOVMR   R2, 2(R1)            GET UBUF
050D0 9A20FF00 (02275)          ANDIF   R2, MSKSLBYT         GET UBUF ID FROM LEFT BYTE
050D2 3C27     (02276)          LRS     R2, 7                CONVERT TO BCT INDEX
050D3 F0740582 (02277)          MOVMR   R7, BCTSBA(R2)       GET HIGH ORDER ADDRESS BIT
050D5 506E0001 (02278)          MOVKR   R6, R7, 1
050D7 3E61     (02279)          ROR     R6, 1                MOVE TO BIT POS 17
050D8 F0540583 (02280)          MOVMR   R5, BCTSBA+HS(R2)    LOW ORDER 16 BITS
050DA 566AFFFF (02281)          IORKR   R6, R5, $FFFF        CONCATENATE BIT 17 TO ADDRESS
               (02282) *
050DC F0740604 (02283)          MOVMR   R7, BCTSAD(R2)       GET SEPARATION
050DE 405C     (02284)          MOVRR   R5, R6              R5 = UBASE
050DF FC540605 (02285)          ADDMR   R5, BCTSAD+HS(R2)     COMPUTE BUFFER EXTENT
050E1 4256     (02286)          CMPRR   R5, R3                TRIG BEYOND BUFFER RANGE?
050E2 813050ED (02287)          JMP     ADMRBS1, GEZ          JUMP IF NOT
               (02288) *
050E4 403C     (02289)          MOVRR   R3, R6                TRIG = UBASE
050E5 F0305159 (02290)          MOVRM   R3, RBABAS+HS         STORE IN APS PROGRAM
050E7 0040     (02291)          CLR     R4
050E8 56470000 (02292)          IORKR   R4, R3, $10000        UPPER BIT SET?
050EA 1810     (02293)          SKP     EOZ                   SKIP IF NOT
050EB D200515B (02294)          SMB     0, RBABAS             ELSE, SET UPPER BIT
               (02295) *
050ED 4E66     (02296) ADMRBS1 SUBRR   R6, R3   UBASE - TRIG
050EE 1820     (02297)          SKP       GTZ
050EF 0B60     (02298)          NEG       R6                 OFFSET MUST BE NON - NEGATIVE
050F0 F02007B4 (02299)          MOVRM   R2, TEMS0            SAVE R2 = BCT INDEX
050F2 86001B50 (02300)          CALL    R0, IDIVS            BSIZE := ABS(UBASE-TRIG )/SEP
               (02301) *
050F4 F02007B4 (02302)          MOVMR   R2, TEMS0
050F6 F0540605 (02303)          MOVMR   R5, BCTSAD + HS(R2)  GET BUFFER SIZE - 1
050F8 4E5F     (02304)          SUBRR   R5, R7               ASIZE -1 := USIZE - BSIZE - 1
               (02305) *
050F9 F0505125 (02306)          MOVRM   R5, BINDBLOK+3       ASIZE - 1
050FB 2771     (02307)          DECR    R7, 1
050FC F070512B (02308)          MOVRM   R7, BINDBLOK+9       BSIZE - 1
               (02309) *
050FE 0F70     (02310)          RETURN
```

```
                    (02311) *       APU - ROTATE ADAM BUFFER
                    (02312) *
                    (02313) *  THIS ROUTINE ASSUMES THAT DATA IS IN 16 BIT FORMAT -
                    (02314) *  EITHER LONG & FIXED OR SHORT & FLOATING PT.
                    (02315) *
                    (02316) *    THERE IS ONE ADDRESSOR FOR BOTH DATA TYPES
                    (02317) *
                    (02318) *    THE SPECIAL BINDING MODULE FORCES THE DATA MODE
                    (02319) *    TO BE SHORT, SINCE THERE IS NO ARITHMETIC OPERATION
                    (02320) *    PERFORMED ON THE DATA.
                    (02321) *
                    (02322) *
    050FF 0800      (02323)          EVEN
                    (02324) *
    05100 0000      (02325)          DATA ADMRBSSA                START ADDRESS
    05101 000A      (02326)          DATA ADMRBSSZ                SIZE OF MODULE
                    (02327) *
                    (02328) ADMRBAPU BEGIN APU(ADMRB)
                    (02329) *
                    (02330) *
A00 05102 0BEC0000 (02331) ADMRBSSA MOV( IQA, OQ ) \ NOP
A01 05104 901C0000 (02332)          JUMPC( ADMRBSSA, FO )
A02 05106 20322032 (02333)          CLEAR( RA )
A03 05108 00000000 (02334)          NOP
A04 0510A 10000000 (02335)          JUMP( 0 )
                   (02336) *
A05 0510C 00000000 (02337)          NOP                  INSERT DUMMY NOP'S FOR 200/300
A06 0510E 00000000 (02338)          NOP                  OBJECT COMPATIBILITY
A07 05110 00000000 (02339)          NOP                  ( # NOP'S = # REAL INSTR'S ABOVE)
A08 05112 00000000 (02340)          NOP
A09 05114 00000000 (02341)          NOP
                   (02342) *
          0000000A (02343) ADMRBSSZ = #A - ADMRBSSA
                   (02344) *
    05116          (02345)          END
```

```
                         (02346) '       APS - ROTATE ADAM BUFFER
                         (02347) *
                         (02348) *  SPECIAL BINDING MODULE MODIFIES BASE ADDRESSES FOR ALL
                         (02349) *  THREE BUFFERS 'A', 'B', AND Y IN THE CONSTRUCTED
                         (02350) *  INSTRUCTION BLOCK
                         (02351) *       1) SETS UP 'ABASE'
                         (02352) *       2) FORCES THE SHORT BIT FOR THE LOAD INSTRUCTIONS
                         (02353) *
                         (02354) *
                         (02355) * INPUT STREAM - UK; FI
                         (02356) * OUTPUT STREAM - YK; FO
                         (02357) *
                         (02358)           EVEN
     05116 0000514E (02359)           ADDR RBAPSSI                  POINTER TO CONSTR. INST. BLOCK
     05118 0000511E (02360)           ADDR ADMRBAPS                 POINTER TO SCALAR BLOCK ( NOT USED )
     0511A 0000     (02361)           DATA      0
     0511B 003C     (02362)           DATA RBAPSSZ                  MODULE SIZE
     0511C 00005146 (02363)           ADDR RBAPSSA                  CHAIN ANCHOR
                    (02364)           EVEN
                    (02365) *
                    (02366) *
                    (02367) ADMRBAPS BEGIN APS(ROTBUFAPS)
                    (02368) *
                    (02369) *
 A00 0511E 00201040 (02370)           JSN(RBOUT, P2)                SET OUTPUT PC
 A01 05120 02300030 (02371)           SET(R0)  ENABLE OUTPUT
                    (02372) *
                    (02373) *    INPUT PROGRAM
                    (02374) *
           00005122 (02375) BINDBLOK = #L
                    (02376) *
 A02 05122 04481000 (02377)           LOAD(BR0, [1], S)             [ABASE] (TRIGGER)
 A03 05124 06500000 (02378)           LOAD(BR1, M$$)                [ASIZE] - 1
 A04 05126 08020000 (02379)           SUB(BR0, M$$)                 ABASE - SEPARATION
                    (02380) *
 A05 05128 0A681006 (02381)           LOAD(BR2, [1], S)             [BBASE]  ( = UBASE )
 A06 0512A 0C700000 (02382)           LOAD(BR3, M$$)                [BSIZE] - 1
 A07 0512C 0E220000 (02383)           SUB(BR2, M$$)                 BBASE - SEPARATION
                    (02384) *
 A08 0512E 10BA9006 (02385) ATRANS    ADD(BR0, [9], TF)
 A09 05130 12190BB1 (02386)           SUBL(BR1, 1), JUMPP(ATRANS)
                    (02387) *
 A0A 05132 14390CBB (02388)           ADDL(BR3, 0), JUMPP(BTRANS)
 A0B 05134 16000F60 (02389)           JUMP(RBENDIN)
```

```
                         (02390) *
A0C 05136 18AA9008 (02391) BTRANS   ADD(BR2, [9], TF)
A0D 05138 1A390CB1 (02392)          SUBL(BR3, 1), JUMPP(BTRANS)
                         (02393) *
A0E 0513A 1C200031 (02394) RBENDIN  CLEAR(RI)
A0F 0513C 1E000020 (02395)          NOP(0)
                         (02396) *
                         (02397) *
A10 0513E 20300032 (02398) RBOUT    SET(RA)
                         (02399) *
A11 05140 2248000A (02400)          LOAD(BW0, [0], S)          [YBASE]
A12 05142 24500000 (02401)          LOAD(BW1, MSS)             [YSIZE] - 1
A13 05144 26020000 (02402)          SUB(BW0, MSS)              BASE := BASE - SEPERATION
                         (02403) *
A14 05146 28BA8006 (02404) OUTTRANS ADD(BW0, [8], TF)
A15 05148 2A1114B1 (02405)          SUBL(BW1, 1), JUMPP(OUTTRANS)
                         (02406) *
A16 0514A 2C200030 (02407)          CLEAR(RO)
A17 0514C 2E000020 (02408)          NOP(0)
                         (02409) *
          00005146 (02410) RBAPS$A = #C
                         (02411) *
                         (02412) *
    0514E                (02413)          END
                         (02414) *
                         (02415) *           STORAGE FOR CONSTRUCTED INSTRUCTIONS
                         (02416) *
    0514E 00000000 (02417) RBAPSSI  DATA 6F'0,0'
     ...
                         (02418) *
          00005158 (02419) RBABAS = #L - 2                     POINT TO 'ABASE' SUBSTITUTION
                         (02420) *
          0000003C (02421) RBAPS$Z = #L - ADMRBAPS             MODULE SIZE
                         (02422) *
```

```
                    (02423) * CROSS REFERENCE
                    (02424) *
                    (02425) *
                    (02426) * END OF MODULE
                    (02427) *
                    (02428) *
           0000515A (02429)          TOESCUR=#L.                  CALCULATE END ADDRESS OF MODULE
                    (02430) *
                    (02431) *
     0515A          (02432)          END
```

CROSS REFERENCE

```
A16SH1A:     00005 (02079) (02172)
A16SH1D:     04FF8 (01983) (02078)
A16SH1F:     0503F (01993) (02118)
A16SH2D:     0504C (02005) (02127)
A16SH2F:     05092 (02015) (02167)
A16SFMA:     04FF0 (02072)
A16SSIZ:     0005C (02065) (02178)
A16SSTOP:    00059 (02123) (02174)
ACOSLIST:    04909 (00214) (00767) (01142) (01317) (01325)
ADAMS16S:    04F7C (00091) (01977)
ADAMSDCS:    04F30 (01791) (01885)
ADAMSSCS:    04FFA (01790) (01829)
ADAMSSS1:    04F46 (01679) (01735)
ADAMSSS2:    04F6C (01702) (01707)
ADAMSSS3:    04F92 (01719) (01733)
ADAMSSSP:    04F32 (00090) (01665)
ADCSH1AD:    00004 (01798) (01893) (01921)
ADCSH1ND:    0000F (01808) (01902)
ADCSH1SP:    00007 (01803) (01898)
ADCSH2AD:    00011 (01799) (01908)
ADCSH2ND:    00018 (01809) (01917)
ADCSH2SP:    00014 (01804) (01913)
ADCSFMA:     00001 (01794) (01889)
ADCSSIZE:    00021 (01883) (01925)
ADCSSMA1:    00006 (01811) (01897)
ADCSSMA2:    00013 (01812) (01912)
ADCSSTOP:    0001F (01906) (01923)
ADMS16C:     04FFF (02030) (02033) (02034) (02049) (02067)
ADMSHA:      04ED4 (01690) (01796)
ADMSHEND:    04EDC (01710) (01806)
ADMSCO:      04FB8 (01998) (02021)
ADMSDFCH:    04EE2 (01746) (01770) (01814) (02026) (02048)
ADMSFMA:     04ED0 (01674) (01793)
ADMSSFP:     04ED8 (01698) (01801)
ADMSSMA:     04EE0 (01721) (01811)
ADMSSFLN:    04ECC (01675) (01691) (01699) (01705) (01711) (01714) (01716) (01727) (01731) (01750)
                   (01754) (01756) (01771) (01790)
ADMRBS:      050B0 (00101) (02248)
ADMRBS0:     050BD (02259) (02262)
ADMRBS1:     050FD (02287) (02296)
ADMRBSSA:    00000 (02325) (02331) (02332) (02343)
ADMRBSSZ:    0000A (02326) (02343)
ADMRBAPS:    0511F (00100) (02360) (02367) (02421)
ADMRBAPU:    05102 (00099) (02328)
```

CROSS REFERENCE

```
ADMPRECH:  000F5 (00019) (00097)
AFDTSORG:  008FB (00020) (00097)
APSBNDR:   00FEA (00021) (02248)
ASCSB1AD:  00004 (01796) (01839) (01861)
ASCSB1ND:  00009 (01806) (01845)
ASCSB1SP:  00008 (01801) (01844)
ASCSB2AD:  0000F (01797) (01851)
ASCSB2ND:  00014 (01807) (01857)
ASCSB2SP:  00013 (01802) (01856)
ASCSFMA:   00001 (01793) (01835)
ASCSSIZE:  0001D (01826) (01866)
ASCSSTOP:  0001B (01849) (01863)
ATRANS:    00008 (02385) (02386)
BCTSAD:    00604 (00023) (00842) (00869) (01563) (01571) (01578) (01587) (01596) (01694) (01986)
                 (02008) (02283) (02285) (02303)
BCTSAT:    00686 (00024) (00600) (00601) (00602) (00603) (01008)
BCTSBA:    00582 (00025) (00751) (01537) (01560) (01580) (01688) (01709) (01715) (01981) (01992)
                 (02003) (02014) (02277) (02280)
BCTSSIZ:   00040 (00026) (01004)
BIDSCHK:   04CBC (00790) (00795) (00821) (00826) (00998)
BIDSRET:   04C9A (01000) (01013)
BINDBLOK:  05122 (02306) (02308) (02375)
BITSBD:    00008 (00027) (01008)
BITSIORD:  00006 (00028) (00600) (00601)
BITSIOWT:  00009 (00029) (00602) (00603)
BTRANS:    0000C (02388) (02391) (02392)
CSWSI161:  002B6 (00031) (00110) (01180)
CSWSI162:  002B8 (00114) (01181)
CSWSI163:  002BA (00115) (01182)
CSWSI171:  002BC (00116)
CSWSI172:  002BE (00117)
CSWSI173:  002C0 (00118)
CSWSI181:  002C2 (00119)
CSWSI182:  002C4 (00120)
CSWSI183:  002C6 (00121)
CSWSI191:  002C8 (00122)
CSWSI192:  002CA (00123)
CSWSI193:  002CC (00124)
CSWSI201:  002CE (00125)
CSWSI202:  002D0 (00126)
CSWSI203:  002D2 (00127)
CSWSI211:  002D4 (00128)
CSWSI212:  002D6 (00129)
CSWSI213:  002D8 (00130)
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CROSS REFERENCE

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CSWS1221:  0020A (00131)
CSWS1222:  0020C (00132)
CSWS1223:  0020E (00133)
CSWS1231:  002E0 (00134)
CSWS1232:  002E2 (00135)
CSWS1233:  002E4 (00136)
CSWSIOS:   00322 (00032) (00145) (01179)
CSWSSTDH:  00405 (00033) (00113) (00114) (00115) (00116) (00117) (00118) (00119) (00120) (00121)
                 (00122) (00123) (00124) (00125) (00126) (00127) (00128) (00129) (00130) (00131)
                 (00132) (00133) (00134) (00135) (00136) (00148) (00149) (00150) (00151) (00152)
                 (00153) (00154) (00155) (00156) (00157) (00158) (00159) (00160) (00161) (00162)
                 (00163) (00164) (00165) (00166) (00167) (00168) (00169) (00170) (00171)
D16SINT1:  049F2 (00113) (00148) (00248) (00256)
D16SINT2:  04A00 (00114) (00149) (00262) (00270)
D16SINT3:  04A0E (00115) (00150) (00276) (00280)
D17SINT1:  04A16 (00116) (00151) (00285) (00293)
D17SINT2:  04A24 (00117) (00152) (00299) (00307)
D17SINT3:  04A32 (00118) (00153) (00313) (00317)
D18SINT1:  04A3A (00119) (00154) (00322) (00330)
D18SINT2:  04A48 (00120) (00155) (00336) (00344)
D18SINT3:  04A56 (00121) (00156) (00350) (00354)
D19SINT1:  04A5E (00122) (00157) (00359) (00367)
D19SINT2:  04A6C (00123) (00158) (00373) (00381)
D19SINT3:  04A7A (00124) (00159) (00387) (00391)
D20SINT1:  04A82 (00125) (00160) (00396) (00404)
D20SINT2:  04A90 (00126) (00161) (00410) (00418)
D20SINT3:  04A9E (00127) (00162) (00424) (00428)
D21SINT1:  04AA6 (00128) (00163) (00433) (00441)
D21SINT2:  04AB4 (00129) (00164) (00447) (00455)
D21SINT3:  04AC2 (00130) (00165) (00461) (00465)
D22SINT1:  04ACA (00131) (00166) (00470) (00478)
D22SINT2:  04AD8 (00132) (00167) (00484) (00492)
D22SINT3:  04AE6 (00133) (00168) (00498) (00502)
D23SINT1:  04AEE (00134) (00169) (00507) (00515)
D23SINT2:  04AFC (00135) (00170) (00521) (00529)
D23SINT3:  04B0A (00136) (00171) (00535) (00539)
ERRSIOS:   00014 (00035) (01079)
ERRSVAL:   04900 (00210) (00757) (01078)
ERRORS:    01AFA (00036) (01080)
EDTS:      007E8 (00038) (00077) (00083) (00088)
HS:        00001 (00040) (00751) (00784) (00842) (00869) (00937) (01021) (01037) (01155) (01157)
                 (01159) (01379) (01384) (01453) (01455) (01521) (01522) (01580) (01587) (01596)
                 (01679) (01695) (01709) (01712) (01741) (01770) (01793) (01794) (01801) (01802)
                 (01803) (01804) (01806) (01807) (01808) (01809) (01811) (01812) (01977) (01992)
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CROSS REFERENCE

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                   (01993) (01995) (02014) (02015) (02022) (02030) (02048) (02280) (02285) (02290)
                   (02303)
IDEVS63:     0003F (00042) (00237) (00558) (00592) (01173)
IDIVS:       01850 (00043) (02300)
ILVLS1:      00001 (00044) (00237) (00558) (00592) (01173) (01235)
ILVLS2:      00002 (00045) (01236)
ILVLS3:      00003 (00046) (01237)
IOSHMTBL:    04844 (00552) (00556) (00575) (00579) (00583) (00587) (00600)
IOSHSR=1:    0484C (00545) (00565) (00612) (00781) (00782)
IOSLBI:      0486C (00550) (00554) (00570) (00571) (00637) (00803) (00804) (00806) (00807) (00817)
                   (00818)
IO2SHDR:     04DC8 (00934) (00950) (00955) (00961) (01505)
IO2SHDR0:    04DDF (01537) (01614)
IO2SHDR1:    04DEF (01560) (01615)
IO2SHDR2:    04DFA (01571) (01616)
IO2SHDR3:    04E00 (01578) (01617)
IO2SHDR4:    04E08 (01587) (01618)
IO2SHDR5:    04E0E (01595) (01619)
IO2SHDR6:    04E18 (01605) (01620)
IO2SHDRD:    04E22 (01532) (01614)
IO2SHDRN:    04DD4 (01527) (01554)
IOBDSLPT:    04E1E (01522) (01547) (01611)
IOBDSOFF:    04E30 (00932) (01595) (01605) (01622)
IOBDSPPT:    04E20 (01521) (01527) (01612)
IOSSER1:     04CBC (00778) (01055)
IOSSER10:    04CD7 (00929) (01073)
IOSSER11:    04CDA (01075) (01553)
IOSSER2:     04CBF (00792) (01057)
IOSSER3:     04CC2 (00797) (01059)
IOSSER4:     04CC5 (00823) (01061)
IOSSER5:     04CC8 (00828) (01063)
IOSSER6:     04CCB (00857) (01065)
IOSSER7:     04CCE (00873) (01067)
IOSSER8:     04CD1 (00900) (00902) (01069)
IOSSER9:     04CD4 (00832) (00906) (01071)
IOSSERR:     04CDD (01056) (01058) (01060) (01062) (01064) (01066) (01068) (01070) (01072) (01074)
                   (01076) (01078)
IOSSFLG:     049D1 (00213) (00223) (00234) (00590) (01163)
IOSSINL:     049E1 (00181) (00220)
IOSSINT:     04B12 (00249) (00253) (00263) (00267) (00286) (00290) (00300) (00304) (00323) (00327)
                   (00337) (00341) (00360) (00364) (00374) (00378) (00397) (00401) (00411) (00415)
                   (00434) (00438) (00448) (00452) (00471) (00475) (00485) (00489) (00508) (00512)
                   (00522) (00526) (00545) (01169) (01171)
IOSSINTC:    04B24 (00277) (00314) (00351) (00388) (00425) (00462) (00499) (00536) (00564)
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ISVTS:      00502 (00047) (00931) (01378) (01443) (02256)
ISVTSSIZ:   00080 (00048) (00928)
LDSSCRL2:   04C7C (00917) (00937) (00971)
LDSSCRL3:   04CA0 (01022) (01030)
LDSSCRL4:   04CAC (01038) (01042)
LDSS:       0489C (00079) (00748)
LDSS0:      04C4A (00891) (00915)
LDSS01:     04C98 (00877) (01020)
LDSS02:     04CA6 (00879) (01036)
LDSSA:      04C13 (00847) (00852) (00861)
LDSSADAM:   048A2 (00753) (01777) (02056)
LDSSB:      04C27 (00864) (00875)
LDSSC:      048BF (00775) (00780)
LDSSNULL:   04C59 (00927) (00932)
MSS:        00000 (00052) (01235) (01236) (01237) (01394) (01461) (01612) (01622) (01835) (01839)
                  (01840) (01844) (01845) (01851) (01852) (01856) (01857) (01889) (01893) (01894)
                  (01897) (01898) (01899) (01901) (01902) (01908) (01909) (01912) (01913) (01914)
                  (01916) (01917) (02079) (02080) (02119) (02128) (02129) (02168) (02378) (02379)
                  (02382) (02383) (02401) (02402)
MPRAAS:     04D66 (00081) (01292)
MPRAAS0:    04DBF (01318) (01324)
MPRAAS1:    04D99 (01326) (01332)
MSKSLBYT:   0FF00 (00050) (00947) (00958) (01295) (01298) (01666) (01724) (01996) (02275)
MSKSRBYT:   000FF (00051) (00748) (00766) (00785) (00813) (00839) (00862) (00867) (00940) (00953)
                  (01293) (01296) (01377) (01442) (01528) (01672) (01685) (01723) (01745) (01749)
                  (01763) (01978) (02025) (02029) (02043) (02254)
OUTTRANS:   00014 (02404) (02405)
RBARAS:     0515B (02262) (02263) (02265) (02267) (02268) (02269) (02290) (02294) (02419)
RBAPSSA:    05146 (02363) (02410)
RBAPSS1:    0514F (02359) (02417)
RBAPSSZ:    0003C (02362) (02421)
RBENDIN:    0000F (02389) (02394)
RBOUT:      00010 (02370) (02398)
RNSS:       04CF4 (00080) (01123) (01778) (02057)
RNSS01:     04D40 (01132) (01201)
RNSS02:     04D4A (01135) (01213)
RNSSFINT:   04D60 (01155) (01156) (01157) (01158) (01159) (01160) (01235)
RNSSINT:    04D06 (01125) (01155) (01302) (01306)
RNSSIOS2:   04D30 (01140) (01150) (01190) (01312) (01313) (01322) (01330) (01384) (01453) (01761)
                  (01765) (02040) (02045)
RNSSIOS3:   04D44 (01201) (01207)
RNSSIOS4:   04D50 (01215) (01221)
RSRS:       04D9A (00085) (01377)
RSRSBMOV:   04DB0 (01379) (01390) (01394)
```

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PAGE   81:     SNAP-11 IOS PACKAGE  ---- APR 18, 1980 ----  PROGRAM # 840001.01A
               CROSS REFERENCE

  SETSSMR:    01C12 (00054) (00220)
  SNAPSINL:   00BEB (00055) (00179) (00225)
  START:      04900 (00067) (00185)
  TEMS0:      007B4 (00057) (00760) (00934) (02299) (02302)
  TEMS1:      007B5 (00058)
  TEMS2:      007B6 (00059) (00844) (00872)
  TOESCUR:    0515A (00072) (02429)
  TOESPTR:    00288 (00060) (00070)
  WS:         00002 (00062) (00552) (00575) (00579) (00583) (00587) (01004) (01158) (01160) (01179)
                    (01665) (01671) (01695) (01704) (01722) (01728) (01746) (01772) (01793) (01794)
                    (01796) (01797) (01798) (01799) (01801) (01802) (01803) (01804) (01806) (01807)
                    (01808) (01809) (01811) (01812) (01826) (01883) (02026) (02050) (02065)
  WAITS0:     049FD (00237)
  WAITSIOS:   049EA (00234) (00239) (00755) (01124) (01301) (01305)
  WSRS:       04DB2 (00086) (01439)
  WSRS1:      04DBC (00911) (01453)
  WSRSHMOV:   04DC6 (01455) (01457) (01461)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E=    0
```

T A B L E O F C O N T E N T S

```
;FAST FOURIER TRANSFORM TRANSFORM ALGORITHSM - FF2R, FF2RB     MAY 7, 1980
*
*    MODIFIED FOR GTE SYLVANIA      BY S. TERRACE
*
;MODIFICATIONS MADE TO CORRECT WBUFFER PROBLEMS....31 JANUARY 1979
;
; TWO REAL TRANSFORMS, Y=2.0*SA*FFT(X+JZ); X, Z REAL
; PERFORMS TWO REAL TRANSFORMS OF SIZE N ON
; THE U BUFFER.  ONE REAL FUNCTION, X, IS STORED IN
; THE REAL PART OF U AND THE OTHER, Z, IS STORED IN
; THE IMAGINARY PART OF U.  RESULTS ARE LEFT IN THE
; Y BUFFER WITH THE TRANSFORM OF X IN THE FIRST HALF
; AND THE TRANSFORM OF Z IN THE SECOND HALF.  SINCE
; THE RESULT SAMPLES 0 AND N/2 ARE KNOWN TO HAVE
; ONLY REAL PARTS, THEIR RESULTS ARE STORED IN BIN
; ZERO WITH RX(0)=RX(0) AND IX(0)=RX(N/2) AND
; RZ(0)=RZ(0) AND IZ(0)=RZ(N/2).
; THE ALGORITHM PRODUCES TWICE THE CORRECT VALUE FOR THE SPECTRAL
; OUTPUTS BEFORE THEY ARE WEIGHTED BY SCALAR A.
;
; THIS ROUTINE CANNOT BE DONE IN PLACE.  I.E.  THE
; Y CANNOT BE THE SAME AS W AND U CANNOT BE THE SAME
; AS W.  BUT Y CAN BE THE SAME AS U.
;
;
; THE BUFFER DESCRIPTIONS ARE:
;    Y BUFFER (10-39)  COMPACT, COMPLEX 32-BIT FLOATING POINT
;    U BUFFER (10-39)  COMPLEX 32-BIT FLOATING POINT
;    V BUFFER (10-39)  REAL 32-BIT FLOATING POINT
;    W BUFFER (10-39)  COMPACT, COMPLEX 32-BIT FLOATING POINT
;
; THE COSINE TABLE ENTRIES ARE:
;    CT(K)=COS(2*PI*K/CSIZE)
; WHERE CSIZE IS A MULTIPLE OF N
;
;
```

```
                 (00037) 'SYSTEM DEPENDENT VARIABLES (SNAP-300 REL. 3.5)
                 (00038) ;
                 (00039) ;  UPDATED TO RELEASE 3.5 BY KEN WILMER,  4-OCTOBER-1979
                 (00040) ;     CORRECTION MADE IN BINDING OF BU FOR CASE WHEN USFP*USIZE > OR = 2**14
                 (00041) ;
                 (00042) ;
                 (00043) ; ALL THESE VARIABLES MUST BE REDEFINED FOR USE
                 (00044) ; WITH A NEW RELEASE OF SNAP EXEC
                 (00045) ;
        000008FB (00046)          AFDTS = $8FB                  ARRAY FUNCTION DISPATCH
        000008FB (00047)          AFDTSORG = AFDTS              DISPATCH TABLE ORIGIN
        000002BB (00048)          TOFSPTR = $2BB                POINTER TO TOP OF EXEC
        0000FF00 (00049)          MSKSLBYT = $FF00              MASK LEFT BYTE
        000000FF (00050)          MSKSRBYT = $00FF              MASK RIGHT BYTE
        00000001 (00051)          HS = 1                        1 HALFWORD = 1 HALFWORD
        00000002 (00052)          WS = 2*HS                     1 FULLWORD = 2 HALFWORDS
        00000582 (00053)          BCTSBA = $582                 BASE ADDRESS TABLE
        00000604 (00054)          BCTSAD = $604                 ARRAY DEFINITION TABLE
        00000686 (00055)          BCTSAT = $686                 BUFFER ATTRIBUTE TABLE
        00000000 (00056)          KSS = 0                       DUMMY ARGUMENT
        00000020 (00057)          FLGSSET = $20                 SET FLAG BIT
        00000004 (00058)          FLGSG0 = $4                   FLAG G0
        00000005 (00059)          FLGSG1 = $5                   FLAG G1
        00000382 (00060)          SVTS = $382                   SCALAR VALUE TABLE
        0000024D (00061)          APSBSL = $24D                 ADDR OF ADDR OF BINDING SUPPORT LIST
        000007BA (00062)          ZERO = $7BA                   ADDR OF ZERO
        0001FFCF (00063)          SYSSFLGS = $1FFCF
        00000F63 (00064)          APSBNDRO = $0F63
                 (00065) ;
        000002BB (00066) #L = TOFSPTR
                 (00067) *
002BB 001049C4   (00068)           ADDR   TOESCUR(,1)           UPDATE TOP OF EXEC POINTER
                 (00069) *
                 (00070) *
        00000003 (00071)           #M = 3
                 (00072) *
        00004690 (00073)           START = $4690                 DEFINE START LOCATION FOR MODULE
```

```
                  (00074) 'DISPATCH TABLE ENTRIES FOR FF2R, FF2RB
                  (00075) ;
                  (00076) ; FF2R HAS FULL BINDING
                  (00077) ; FF2RB ONLY BINDS YBASE AND UBASE AND WBASE
                  (00078) ;
         000000D6 (00079)          FF2R$=214
         000000D7 (00080)          FF2RB$=215
                  (00081) ;
         00000AEC (00082)          #L=AFDTS+3*WS*(FF2R$-128)
    00AEC 001F47BC (00083)          ADDR CSM2$(R7, 1)
    00AEE 001F48C4 (00084)          ADDR CSM$(R7, 1)
    00AF0 00104690 (00085)          ADDR FFTSSET(, 1, 0)
                  (00086) ;
         00000AF2 (00087)          #L=AFDTS+3*WS*(FF2RB$-128)
    00AF2 001F47BC (00088)          ADDR CSM2$(R7, 1)
    00AF4 001F48C4 (00089)          ADDR CSM$(R7, 1)
    00AF6 00104754 (00090)          ADDR SBM$FFT(, 1, 0)
                  (00091) ;
                  (00092) ;
         00004690 (00093) #L = START           SET PC TO START LOCATION OF MODULE
```

```
                  'SPECIAL BINDING MODULE FOR FFT SETUP
                  ;
                  ; DOES ALL BINDING NOT NEEDED EVERY TIME
                  ; AN FFT IS DONE.
                  ;
                  ; ENTER WITH R1 POIOTING TO FCB NUMBER
                  ;          R2 POINTING TO DISPATCH TABLE
                  ;
                  ;
04690 F0420002    FFTSSET MOVMR R4, 2*HS(R1)            GET U BUFFER ID
04692 9A40FF00            ANDIR R4, MSKSLBYT            MASK OUT RIGHT HALF
04694 3C47                LRS R4, 7                     SET FOR FULL WORD INDEX
04695 0800                EVEN                          SKIP TO EVEN BOUNDARY
04696 F0580687            MOVMR R5, BCTSAT+HS(R4)       R5= U BUFFER ATTRIBUTES
04698 F05047B8            MOVRM R5, PWR2S               STORE FOR LATER REFERENCE
                  ;
                  ;BIND ALL USIZE-1'S AND USIZE-2
                  ;
0469A C0580604            MOVMRL R5, BCTSAD(R4)         R5<=USEP, R6<=USIZE-1
0469C F0604935            MOVRM R6, CSMS+WS*CR4A03+HS   STORE ALL USIZE-1'S
0469E F06048C9            MOVRM R6, CSMS+WS*CSML0S+HS   ...
046A0 F060497D            MOVRM R6, CSMS+WS*CR4A8S+HS   ...
046A2 F0604995            MOVRM R6, CSMS+WS*CR4A9S+HS   STORE FFTSIZE-1
046A4 F060494D            MOVRM R6, CSMS+WS*CR4A13S+HS  ...
046A6 2761                DECR R6, 1
046A7 0800                EVEN
046A8 F0604957            MOVRM R6, CSMS+WS*FOS03+HS    BIND USIZE-2

046AA 2662                INCR R6, 2                    R6<=N(USIZE)
046AB 403A                MOVRR R3, R5                  R3<=USEP
046AC 485C                MULRR R5, R6                  R5<=2(USEP)(USIZE)
046AD 3C52                LRS R5, 2                     R5<=0.5(USEP)(USIZE)
                  ;
                  ;BIND ALL HU'S
                  ;
046AE 90404781            MOVIR   R4,HUSTBL-1           ; POINT TO TABLE OF HU BINDING LOC'S
046B0 304F        HUSLP   POPXI   R4,R7                 ; GET NEXT BINDING ADDR
046B1 0270                TEST    R7                    ; CHECK FOR END OF TABLE
046B2 801046BC            JMP     HUSDN,EQ              ; ZERO MARKS END OF TABLE
046B4 D00F0000            CMB     0,0(R7)               ; RESET MSB OF DELTA FIELD
046B6 F05F0001            MOVRM   R5,1(R7)              ; STORE LOW 16 BITS
046B8 1810                SKPL    NE                    ; IF NOT 0, DELTA IS OK
046B9 D20F0000            SMB     0,0(R7)               ; PRODUCT WAS 2**18 BEFORE CORRECTION
046BB 210C                BOP     HUSLP                 ; LOOP FOR ALL HU BINDING
```

```
                    (00138) ;
046BC 0250          (00139) BUSDN    TEST     R5                         ; CHECK PRODUCT
046BD 1B10          (00140)          SKPL     NF                         ; IF NOT 0, DELTA IS OK
046BE FC510000      (00141)          MOVAP    R5,S10000                  ; SET UP CORRECT DELTA FOR 2**18
                    (00142) ;
046C0 3C51          (00143)          LRS R5, 1                         R5<=B0/2 (QU)
046C1 0800          (00144)          EVEN                              TO TO EVEN BOUNDARY
                    (00145) ;
                    (00146) ;BIND ALL QU'S
                    (00147) ;
046C2 F0504BD7      (00148)          MOVRM R5, CSMS+WS*CSML3S+HS       STORE QU'S
046C4 4E56          (00149)          SUBRR R5, R3                      R5<=QU-USEP
046C5 0800          (00150)          EVEN
046C6 F0504BCF      (00151)          MOVRM R5, CSMS+WS*CSML1S+HS       STORE QU-USEP
046C8 405C          (00152)          MOVRR R5, R6                      R5<=N
046C9 0800          (00153)          EVEN
046CA 98500003      (00154)          MULIR R5, 3                       R5<=4*(3N/2)
                    (00155) ;
                    (00156) ;BIND D0-D7'S
                    (00157) ;
046CC F0504BF5      (00158)          MOVRM R5, CSMS+WS*SCRM0+HS        STORE ALL D0'S
046CE F0504BF9      (00159)          MOVRM R5, CSMS+WS*SCRM2S+HS       ...
046D0 F0504BFD      (00160)          MOVRM R5, CSMS+WS*SCRM4S+HS       ...
046D2 F0504BF1      (00161)          MOVRM R5, CSMS+WS*SCRM6S+HS       ...
046D4 3C51          (00162)          LRS R5, 1                         R5<=D0/2 (D1)
046D5 0800          (00163)          EVEN
046D6 F0504BF7      (00164)          MOVRM R5, CSMS+WS*SCRM1S+HS       STORE ALL D1'S
046D8 F0504BEF      (00165)          MOVRM R5, CSMS+WS*SCRM5S+HS       ...
046DA 3C51          (00166)          LRS R5, 1                         R5<=D1/2 (D2)
046DB 0800          (00167)          EVEN
046DC F0504BEB      (00168)          MOVRM R5, CSMS+WS*SCRM3S+HS       STORE D2
046DE 3C51          (00169)          LRS R5, 1                         R5<=D2/2 (D3)
046DF 0800          (00170)          EVEN
046E0 F0504BF5      (00171)          MOVRM R5, CSMS+WS*SCRM7S+HS       STORE D3
046E2 3C51          (00172)          LRS R5, 1                         R5<=D3/2 (D4)
046E3 0800          (00173)          EVEN
046E4 F0504BEB      (00174)          MOVRM R5, CSMS+WS*SCRM8S+HS       STORE D4
046E6 3C51          (00175)          LRS R5, 1                         R5<=D4/2 (D5)
046E7 0800          (00176)          EVEN
046E8 F0504901      (00177)          MOVRM R5, CSMS+WS*SCRM9S+HS       STORE D5
046EA 3C51          (00178)          LRS R5, 1                         R5<=D5/2 (D6)
046EB 0800          (00179)          EVEN
046EC F0504907      (00180)          MOVRM R5, CSMS+WS*SCRM10S+HS       STORE D6
046EE 3C51          (00181)          LRS R5, 1                         R5<=D6/2 (D7)
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```
046FF 0800      (00182)         EVEN
046F0 F050490B (00183)         MOVRM R5, CSMS+WS*SCRM7+HS      STORE D7
046F2 405C      (00184)         MOVRR R5, R6                    R5<=N (USIZE)
                (00185) ;
                (00186) ;BIND 2N'S AND 4N'S
                (00187) ;
046F3 3A51      (00188)         LLS R5, 1                       R5<=2*N
                (00189)         EVEN
046F4 F05049A3 (00190)         MOVRM R5, CSMS+WS*FOS3+HS       BIND 2N'S
046F6 F0504955 (00191)         MOVRM R5, CSMS+WS*FOSO2+HS      ...
046F8 3A51      (00192)         LLS R5, 1                       R5<=4N
046F9 0800      (00193)         EVEN
046FA F05049A9 (00194)         MOVRM R5, CSMS+WS*FOS4+HS       BIND 4N
046FC 2654      (00195)         INCR R5, 4                      R5<=4*N+4
046FD 0800      (00196)         EVEN
                (00197) ;
                (00198) ;BIND ALL 4N+4 AND 4N+12'S
                (00199) ;
046FE F0504937 (00200)         MOVRM R5, CSMS+WS*CR4A2S+HS     STORE 4N+4'S
04700 F050497B (00201)         MOVRM R5, CSMS+WS*CR4A3+HS      ...
04702 2658      (00202)         INCR R5, 8                      R5<=4*N+12
04703 0800      (00203)         EVEN
04704 F0504915 (00204)         MOVRM R5, CSMS+WS*CSMOL+HS      STORE 4N+12
                (00205) ;
                (00206) ;BIND SCALAR A
                (00207) ;
04706 F0420001 (00208)         MOVMR R4, HS(R1)                LOAD SCALAR A ID
04708 9A4000FF (00209)         ANDIR R4, MSKSRBYT              MASK IT OUT
0470A 9C4803B2 (00210)         ADDIR R4, SVTS(R4)              R4<=SVTS+WS*SAID
0470C F040499D (00211)         MOVRM R4, CSMS+WS*FOS1+HS       BIND SCALAR A
0470E F0420003 (00212)         MOVMR R4, 3*HS(R1)              LOAD C BUFFER ID
04710 9A40FF00 (00213)         ANDIR R4, MSKSLBYT
04712 3C47      (00214)         LRS R4, 7                       CREATE FULL WORD INDEX
04713 0800      (00215)         EVEN
                (00216) ;
                (00217) ;BIND CBASE
                (00218) ;
04714 C06805B2 (00219)         MOVMRL R6, BCTSBA(R4)           LOAD C BASE ADDRESS
04716 9050496A (00220)         MOVIR R5, CSMS+WS*CR4A4S        POINT TO LOAD CBASE INST.
04718 9A60000F (00221)         ANDIR R6, SF                    AND OUT LOW FOUR BITS
0471A 766AFFF0 (00222)         IORWR R6, R5, $FFF0             OR IN NEW FOUR BITS
0471C 846A0000 (00223)         MOVRML R6, 0(R5)                AND STORE BACK IN INST.
0471E C0580604 (00224)         MOVMRL R5, BCTSAD(R4)           R5<=CSEP, R6<=CSIZE-1
04720 2661      (00225)         INCR R6, 1                      R6<=CSIZE
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04721 485C     (00226)          MOLRR R5, R6                    R5<=2*(CSEP)(CSIZE)
04722 3C53     (00227)          LRS R5, 3                       R5<=0.25*(CSEP)(CSIZE) (HPI)
04723 0800     (00228)          EVEN
               (00229) ;
               (00230) ;BIND ALL HPI'S
               (00231) ;
04724 F0504971 (00232)          MOVRM R5, CSMS+WS*CR4A5S+HS     STORE ALL HPI'S
04726 F0504975 (00233)          MOVRM R5, CSMS+WS*CR4A6S+HS     ...
04728 F0504979 (00234)          MOVRM R5, CSMS+WS*CR4A7S+HS     ...
               (00235) ;
               (00236) ;S1ANG=HPI/SSI. RIGHT NOW ONLY RADIX 2 AND RADIX 4
               (00237) ;HAVE BEEN IMPLEMENTED.  SO ALL THAT IS NECESSARY
               (00238) ;TO CALCULATE SSI IS TO KNOW IF USIZE IS AN EVEN OR
               (00239) ;ODD POWER OF TWO.  THIS IS DONE BY CHECKING THE
               (00240) ;POWER OF TWO ENTRY FOR THE U BUFFER IN THE BCTSAT
               (00241) ;TABLE.  IF BIT 0 IS ON, THEN IT'S AN ODD POWER.
               (00242) ;
0472A F030024D (00243)          MOVMR   R3, APSBSL               ; GET BINDING SUPPORT LIST POINTER
0472C D80647B8 (00244)          SMBC 0, PWR2S                   SKIP IF EVEN POWER OF TWO
0472E 2006     (00245)          HOP SBMS1                       ... ODD POWER
0472F F8084927 (00246)          MOVLM 4, CSMS+WS*CR4A01+HS      SET AND BIND SSI = 4
04731 F80A47B1 (00247)          MOVLM FLGSG1, GSFLGS+HS          RADIX 4 FIRST STEP
04733 3C52     (00248)          LRS R5, 2                       S1ANG=HPI/4
04734 2005     (00249)          HOP SBMS2
04735 F8044927 (00250) SBMS1    MOVLM 2, CSMS+WS*CR4A01+HS      SET AND BIND SSI = 2
04737 F84A47B1 (00251)          MOVLM FLGSG1+FLGSSET, GSFLGS+HS  RADIX 2 FIRST STEP
04739 3C51     (00252)          LRS R5, 1                       S1ANG=HPI/2
               (00253)          EVEN
               (00254) SBMS2
               (00255) ;
               (00256) ;BIND S1ANG TO S?ANG'S
               (00257) ;
0473A F05049B7 (00258)          MOVRM R5, CSMS+WS*ANGL1S+HS     STORE S1ANG
0473C 3C52     (00259)          LRS R5, 2
0473D 0800     (00260)          EVEN
0473E F05049B9 (00261)          MOVRM R5, CSMS+WS*ANGL2S+HS     STORE S2ANG
04740 3C52     (00262)          LRS R5, 2
04741 0800     (00263)          EVEN
04742 F05049BB (00264)          MOVRM R5, CSMS+WS*ANGL3S+HS     STORE S3ANG
04744 3C52     (00265)          LRS R5, 2
04745 0800     (00266)          EVEN
04746 F05049BD (00267)          MOVRM R5, CSMS+WS*ANGL4S+HS     STORE S4ANG
04748 3C52     (00268)          LRS R5, 2
04749 0800     (00269)          EVEN
```

```
0474A F05049BF (00270)         MOVRM R5, CSMS+WS*ANGL5S+HS   STORE S5ANG
0474C 3C52     (00271)         LRS R5, 2
0474D 0800     (00272)         EVEN
0474E F05049C1 (00273)         MOVRM R5, CSMS+WS*ANGL6S+HS   STORE S6ANG
04750 3C52     (00274)         LRS R5, 2
04751 0800     (00275)         EVEN
04752 F05049C3 (00276)         MOVRM R5, CSMS+WS*ANGL7S+HS   STORE S7ANG
```

```
                    (00277) *          SPECIAL BINDING FOR WBASE, YBASE, AND UBASE
                    (00278) ;
                    (00279) ; THIS SECTION DOES THE FAST BINDING FOR
                    (00280) ; CHANGES IN WBASE, YBASE, AND UBASE ONLY.
                    (00281) ;
                    (00282) SBMSEFT EVEN                              START ON EVEN BOUNDARY
04754 F0420004 (00283)          MOVMR R4, 4*HS(R1)              GET W BUFFER ID
04756 9A40FF00 (00284)          ANDIR R4, MSKSLBYT              MASK THE LEFT HALF
04758 3C47     (00285)          LRS R4, 7                       CREATE FULL WORD INDEX
04759 0R00     (00286)          EVEN
                    (00287) ;
                    (00288) ;BIND ALL WBASE'S
                    (00289) ;
0475A C06R05R2 (00290)          MOVMRL R6, BCTSBA(R4)           LOAD BASE ADDRESS IN R6, R7
0475C 90504910 (00291)          MOVIR R5, CSMS+WS*CSM01S        POINT TO LOAD INSTRUCTION
0475E 9A60000F (00292)          ANDIR R6, SF                    ONLY LOW FOUR BITS
04760 766AFFF0 (00293)          IORWK R6, R5, SFFF0             'OR'ED INTO LOAD INST.
04762 846A0000 (00294)          MOVRML R6, 0(R5)                STORE ALL WBASE'S
04764 9A60000F (00295)          ANDIR R6, SF                    MASK OUT OLD LOAD INST.
04766 9050499F (00296)          MOVIR R5, CSMS+WS*F0S2          POINT TO NEXT LOAD
04768 766AFFF0 (00297)          IORWK R6, R5, SFFF0             OR INTO INSTRUCTION
0476A 846A0000 (00298)          MOVRML R6, 0(R5)                BIND WBASE
0476C 9A60000F (00299)          ANDIR R6, SF                  MASK OUT OLD LOAD INSTR
0476E 9050492C (00300)          MOVIR R5, CSMS+WS*CR4A1S      POINT TO NEXT LOAD
04770 504C0001 (00301)          MOVKR R4, R6, S1                PLACE MSB INTO SEP REG
04772 9A61FFFE (00302)          ANDIR R6, S1FFFE              CLR MSB IOF WBASE ADDR
04774 2774     (00303)          DECR R7, 4                    WBASE-4
04775 0640     (00304)          DAC R4                        CARRY INTO MSB
04776 566R0001 (00305)          IORKR R6, R4, S1              PLACE PROPER MSB INTO RESULT
04778 766BFFF0 (00306)          IORWK R6, R5, SFFFF0           'OR' INTO LOAD INSTR
0477A 846A0000 (00307)          MOVRML R6, 0(R5)              LOAD WBASE-4 INTO APS
0477C 9A60000F (00308)          ANDIR R6, SF                  MASK OUT OLD LOAD INSTR
                    (00309) ;
                    (00310) ;BIND UBASE
                    (00311) ;
0477E F0420002 (00312)          MOVMR R4, 2*HS(R1)              LOAD U BUFFER ID
04780 9A40FF00 (00313)          ANDIR R4, MSKSLBYT              MASK THE LEFT HALF
04782 3C47     (00314)          LRS R4, 7                       CREATE FULL WORD INDEX
04783 0R00     (00315)          EVEN
04784 C06R05R2 (00316)          MOVMRL R6, BCTSBA(R4)           LOAD UBASE ADDRESS IN R6, R7
04786 90504RC6 (00317)          MOVIR R5, CSMS+WS*CSML6S        POINT TO LOAD UBASE INST.
04788 9A60000F (00318)          ANDIR R6, SF                    ONLY LOW ORDER FOUR BITS
0478A 766AFFF0 (00319)          IORWK R6, R5, SFFF0             'OR' INTO INST.
0478C 846A0000 (00320)          MOVRML R6, 0(R5)                STORE UBASE
```

```
                    (00321) ;
                    (00322) ;BIND YBASE
                    (00323) ;
0478E E0420001 (00324)        MOVMR R4, BS(R1)          LOAD Y BUFFER ID
04790 9A40FF00 (00325)        ANDIR R4, MSKSLBYT        MASK LEFT HALF
04792 3C47     (00326)        LRS R4, 7                 CREATE FULL WORD INDEX
04793 0800     (00327)        EVEN
04794 C0680582 (00328)        MOVMRL R6, BCTSBA(R4)     LOAD YBASE ADDRESS IN R6, R7
04796 90504950 (00329)        MOVIR R5, CSMS+WS*FOS01   POINT TO LOAD INST.
04798 9A60000F (00330)        ANDIR R6, $F              MASK LOW FOUR BITS
0479A 766AFFF0 (00331)        IORWK R6, R5, $FFF0       OR INTO INST.
0479C 846A0000 (00332)        MOVRML R6, 0(R5)          STORE YBASE
```

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                   (00333) *          SET PENDING SLOTS TO PROPER VALUES
                   (00334) ;
0479E C63408FB (00335)          PUSHMIL R3, AFDTSORG(R2)      STORE APU MODULE BUS ORIGIN
                   (00336)
047A0 9071FFFF (00337)          MOVIR R7, -WS
047A2 C6B7FFFF (00338)          PUSHBIL R3, W-WS(R3)          STORE APU MODULE START AND SIZE
047A4 C6340BFA (00339)          PUSHMIL R3, AFDTSORG+WS(R2)   STORE APS MODULE BUS ORIGIN
                   (00340) **       PUSHMIL R3, AFDTSORG + 2*WS(R2) ; STORE CSPU SUPPORT ADDR
047A6 2632      (00341)          INCR R3, 2
047A7 2771      (00342)          DECR R7, 1
                   (00343)          EVEN
047A8 C4B7FFFC (00344)          PUSHMI R3, W-2*WS(R3)         STORE APS MODULE SIZE
                   (00345) **       PUSHMI  R3, ZERO                ; NO SPECIAL SUPPORT
                   (00346) **       MOVRR R5, R1
                   (00347) **       INCR R5, HS                   POINT TO SCALAR A ID
                   (00348) **       MOVWR R4, R5, MSKSBBYT
                   (00349) **       PUSHXIL R3, R4                STORE SCALAR A IDENTIFIER
047AA 2634      (00350)          INCR    R3, 4
047AB C43047B1 (00351)          PUSHMI  R3, GSFLGS+HS         STORE FLAG G1
                   (00352) *
                   (00353) **       INCR R3, 2
                   (00354) **       PUSHMI R3, ZERO               SET FOR NO PBF
                   (00355) *
047AD 80000F63 (00356)          JMP   APSBNDRO                AND EXIT
                   (00357) ;
047AF 0800      (00358)          EVEN
047B0 0004      (00359) GSFLGS   DATA    $4, $25                 ; GO & G1 FLAG CONTROL STORAGE
047B1 0025
                   (00360) ;
047B2 48CC      (00361) BUSTBL   DATA    CSMS + WS*CSML          ; ADDRESS TABLE FOR BU BINDING
047B3 48D0      (00362)          DATA    CSMS + WS*CSME
047B4 48D4      (00363)          DATA    CSMS + WS*CSML2S
047B5 48D8      (00364)          DATA    CSMS + WS*CSML4S
047B6 48DF      (00365)          DATA    CSMS + WS*CSML5S
047B7 0000      (00366)          DATA    0
                   (00367) ;
047B8 0000      (00368) PWR2S    DATA    0                       ; STORAGE FOR POWER OF TWO
```

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                    (00369) 'FFT - AP PROGRAMS
          00000003  (00370)          #M=3                     THIS IS A MAP-300 PROGRAM
                    (00371)          OPADD FWI, (3 .LS. 10)+(12 .LS. 5)+X'16'
                    (00372) !    APU PROGRAMS
                    (00373) ;
                    (00374) ;BINDING SECTION FOR EXEC
                    (00375) ;
    047B9 0800      (00376)          EVEN
    047BA 0000      (00377)          DATA CSM2SSA
    047BB 0080      (00378)          DATA CR4SSZ
                    (00379)          EVEN
                    (00380) ;
                    (00381) ;
```

```
                    (00382) *         SCRAMBLE AND FIRST RADIX-2 STAGE, FORWARD
                    (00383) ; 03/08/78
                    (00384) ; SCRAMBLE AND FIRST STAGE OF FFT,G1 SET
                    (00385) ;
                    (00386) ; FUNCTION
                    (00387) ; LETTING EIGHT SUCESSIVE INPUTS BEING DESIGNATED BY
                    (00388) ; RU0,RU1,IU1,IU0,IU2,IU3,RU3,RU2
                    (00389) ; THE EIGHT OUTPUTS ARE PROVIDED
                    (00390) ; RU0+RU1,RU0-RU1,IU0+IU1,IU0-IU1
                    (00391) ;  IU2+IU3,IU2-IU3,RU2+RU3,RU2-RU3
                    (00392) ; FOR RELATIONSHIP OF INPUTS TO U(K), AND OUTPUTS TO Y(K),
                    (00393) ; SEE SUPPORTING APS PROGRAM, CSM
                    (00394) ;
                    (00395) CSM2S   BEGIN APU(CSM2)
           00000000 (00396)         #A=00
                    (00397) ;
A00 047BC 90050000 (00398) CSM2SSA JUMPC(CSM4F, G1)
A01 047BE 10000003 (00399)         JUMP(CSM2F)
                    (00400) ;
A02 047C0 089C089C (00401) CSM2L   MOV(R,OO)                                  OO=IY0\IY1
                    (00402) ;
A03 047C2 08E008E0 (00403) CSM2F   MOV(IQA,A0)                                A0=RU0
A04 047C4 08E108E1 (00404)         MOV(IQA,A1)                                A1=RU1
A05 047C6 41004900 (00405)         ADD(A0,A1)\SUB(A0,A1)
                    (00406) ;
A06 047C8 08E308E3 (00407)         MOV(IQA,A3)                                A3=IU1
A07 047CA 08E208E2 (00408)         MOV(IQA,A2)                                A2=IU0
A08 047CC 435C4B5C (00409)         MOV(OO),ADD(A2,A3)\MOV(OO),SUB(A2,A3)      OO=RY0\RY1
                    (00410) ;
A09 047CE 90160002 (00411)         JUMPC(CSM2L,FWI)
                    (00412) ;
A0A 047D0 089C089C (00413)         MOV(R,OO)                                  OO=IY0\IY1
                    (00414) ;
A0B 047D2 00000000 (00415)         NOP
A0C 047D4 1000002B (00416)         JUMP(CR4FS)
                    (00417) ;
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                   (00418) *           SCRAMBLE AND FIRST RADIX-4 STAGE, FORWARD
                   (00419) ; SCRAMBLE AND FORWARD RADIX 4 STAGE OF FFT,G1 CLEAR
                   (00420) ;
                   (00421) ; FUNCTION
                   (00422) ; THE EIGHT SUCESSIVE INPUTS ARE PROVIDED TO LOOP
                   (00423) ; RU0,RU1,IU1,IU0,IU2,IU3,RU3,RU2
                   (00424) ; THE INTERMEDIATE RADIX TWO RESULTS ARE CALCULATED
                   (00425) ; S0=U0+U1,S1=U0-U1,S2=U2+U3,S3=U2-U3
                   (00426) ; THE OUTPUTS THEN BEING GIVEN BY
                   (00427) ; Y0=S0+S2,Y1=S1-JS3,Y2=S0-S2,Y3=S1+JS3
                   (00428) ; THE ACTUAL OUTPUT SEQUENCE BEING
                   (00429) ; RY0,RY1,IY0,IY1,IY2,IY3,RY2,RY3
                   (00430) ;
                   (00431) ; APU INITIALIZATION
                   (00432) ;
                   (00433) ;
A0D 047D6 0RF00RF0 (00434) CSM4F   MOV(IOA,A0)                                      A0=RU0\RU0
A0E 047D8 0RF10RF1 (00435)         MOV(IOA,A1)                                      A1=RU1\RU1
A0F 047DA 0RF30RF3 (00436)         MOV(IOA,A3)                                      A3=IU1\IU1
A10 047DC 41004900 (00437)         ADD(A0,A1)\SUB(A0,A1)
A11 047DE 0RF20RF2 (00438)         MOV(IOA,A2)                                      A2=IU0\IU0
A12 047E0 10000018 (00439)         JUMP(CSM4FS)
                   (00440) ;
                   (00441) ;
                   (00442) ; CSM4F, APU INNER LOOP
                   (00443)
A13 047E2 46BC4EBC (00444) #1      MOV(OQ),ADD(A5,A6)\MOV(OQ),SUB(A5,A7)            OQ=RY0\RY1
A14 047E4 0RF00RF0 (00445)         MOV(IOA,A0)                                      A0=RU0
                   (00446)
A15 047E6 4EBC47BC (00447)         MOV(OQ),SUB(A5,A6)\MOV(OQ),ADD(A5,A7)            OQ=IY0\IY1
A16 047E8 0RF10RF1 (00448)         MOV(IOA,A1)                                      A1=RU1
                   (00449)
A17 047EA 4F9C4F9C (00450)         MOV(OQ),SUB(A4,A7)\MOV(OQ),SUB(A4,A6)            OQ=IY2\IY3
A18 047EC 0RF30RF3 (00451)         MOV(IOA,A3)                                      A3=IU1
                   (00452)
A19 047EE 411C491C (00453)         MOV(OQ),ADD(A0,A1)\MOV(OQ),SUB(A0,A1)            OQ=RY2\RY3
A1A 047F0 0RF20RF2 (00454)         MOV(IOA,A2)                                      A2=IU0
                   (00455)
A1B 047F2 43544B54 (00456) CSM4FS  MOV(A4),ADD(A2,A3)\MOV(A4),SUB(A2,A3)            A4=RS0\RS1
A1C 047F4 0RF00RF0 (00457)         MOV(IOA,A0)                                      A0=IU2
A1D 047F6 0RF10RF1 (00458)         MOV(IOA,A1)                                      A1=IU3
                   (00459)
A1E 047F8 41154915 (00460)         MOV(A5),ADD(A0,A1)\MOV(A5),SUB(A0,A1)            A5=IS0\IS1
A1F 047FA 0RF30RF3 (00461)         MOV(IOA,A3)                                      A3=RU3
```

```
A20 047FC 08F208F2 (00462)        MOV(IOA,A2)                                  A2=RU2
                   (00463)
A21 047FF 43564856 (00464)        MOV(A6),ADD(A2,A3)\MOV(A6),SUB(A2,A3)        A6=IS2\IS3
                   (00465)
A22 04800 47974697 (00466)        MOV(A7),ADD(A4,A7)\MOV(A7),ADD(A4,A6)        A7=RS2\RS3
                   (00467)
A23 04802 90160013 (00468)        JUMPC(#1,FWI)
                   (00469)
A24 04804 46BC4FBC (00470)        MOV(OO),ADD(A5,A6)\MOV(OO),SUB(A5,A7)        OO=RY0\RY1
A25 04806 4EBC47BC (00471)        MOV(OO),SUB(A5,A6)\MOV(OO),ADD(A5,A7)        OO=IY0\IY1
A26 04808 4F9C4F9C (00472)        MOV(OO),SUB(A4,A7)\MOV(OO),SUB(A4,A6)        OO=IY2\IY3
A27 0480A 089C089C (00473)        MOV(R,OO)                                    OO=RY2\RY3
```

```
'          SUCCESSIVE RADIX-4 STAGES, FORWARD
;
;USES APS PROGRAM CR4A
;
;MATHEMATICS
;
; W=A+BF+CF2+DF3=P+Q
; X=A-JBF-CF2+JDF3=R-S
; Y=A-BF+CF2-DF3=P-Q
; Z=A+JBF-CF2-JDF3=R+S

; P=A+CF2,R=A-CF2
; Q=F(B+DF2),S=JF(B-DF2)

; PR=AR+CRCOS2X+CISIN2X
; PI=AI+CICOS2X-CRSIN2X
; RR=AR-CRCOS2X-CISIN2X
; RI=AI-CICOS2X+CRSIN2X
; QR=BRCOSX+BISINX+DRCOS3X+DISIN3X
; QI=BICOSX-BRSINX+DICOS3X-DRSIN3X
; SR=BRSINX-BICOSX+DICOS3X-DRSIN3X
; SI=BRCOSX+BISINX-DRCOS3X-DISIN3X
;
; SINX STORED IN M1\M5
; SIN2X STORED IN M6\M2
; SIN3X STORED IN M7\M3
; COSX STORED IN M5\M1
; COS2X STORED IN M2\M6
; COS3X STORED IN M3\M7

         EJECT
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```
                    (00505) ;CR4F-PIPELINE STARTUP
                    (00506)
                    (00507)
A28 0480C 2028202B (00508) CR4FS    CLEAR(AF3)
A29 0480E 202A202A (00509)          CLEAR(AF2)
A2A 04810 20292029 (00510) CR4FSA   CLEAR(AF1)
A2B 04812 20282028 (00511)          CLEAR(AF0)
                    (00512)
A2C 04814 16801680 (00513)          F(1)
A2D 04816 08090BF0 (00514)          MOV(ZERO,M1)\MOV(IOA,A0)                AO=DI\DR
A2E 04818 0BF0080D (00515)          MOV(IOA,A0)\MOV(ZERO,M5)                SINX=0=M1\M5
                    (00516)
                    (00517)
A2F 0481A 08800889 (00518)          MOV(R,M5)\MOV(R,M1)                     COSX=1=M5\M1
A30 0481C 088A088E (00519)          MOV(R,M2)\MOV(R,M6)                     COS2X=1=M2\M6
A31 0481E 088B088F (00520)          MOV(R,M3)\MOV(R,M7)                     COS3X=1=M3\M7
                    (00521)
A32 04820 0BF1080A (00522)          MOV(IOA,A1)\MOV(ZERO,M2)                A1=BI\BR
A33 04822 080F0BF1 (00523)          MOV(ZERO,M6)\MOV(IOA,A1)                SIN2X=0=M6\M2
A34 04824 080F080B (00524)          MOV(ZERO,M7)\MOV(ZERO,M3)               SIN3X=0=M7\M3
                    (00525)
A35 04826 0BF80BF8 (00526)          MOV(IOA,M0)                             M0=CR
A36 04828 84408440 (00527)          MUL(M0,M6)                              P=CRSIN2X\CRCOS2X
A37 0482A 0A200220 (00528)          NEG(A1)\R(A1)                           R=-BI\BR
                    (00529)
A38 0482C 10000054 (00530)          JUMP(CR4FE)
                    (00531)
                    (00532) ;CR4F:COSINE ENTRY
                    (00533) ;
A39 0482E 0BFD0BF9 (00534) CR4FC    MOV(IOA,M5)\MOV(IOA,M1)                 COSX TO M5\M1
A3A 04830 0BF90BFD (00535)          MOV(IOA,M1)\MOV(IOA,M5)                 SINX TO M1\M5
A3B 04832 08A008A0 (00536)          MOV(P,NULL)
A3C 04834 0BFE0BFA (00537)          MOV(IOA,M6)\MOV(IOA,M2)                 SIN2X TO M6\M2
A3D 04836 0BFA0BFE (00538)          MOV(IOA,M2)\MOV(IOA,M6)                 COS2X TO M2\M6
A3E 04838 0BFB0BFF (00539)          MOV(IOA,M3)\MOV(IOA,M7)                 COS3X TO M3\M7
A3F 0483A 0BFF0BFB (00540)          MOV(IOA,M7)\MOV(IOA,M3)                 SIN3X TO M7\M3
                    (00541) ;
                    (00542) ;CR4F-BUTTERFLY
                    (00543)
A40 0483C 0BF80BF8 (00544) CR4FB    MOV(IOA,M0)                             DR TO M0
A41 0483E 4A748A7A (00545)          MOV(A4),MULN(M0,M7)\MOV(A4),MUL(M0,M7)  A4=CICOS2X\CISIN2X
A42 04840 4A954455 (00546)          MOV(A5),SUB(A4,A2)\MOV(A5),ADD(A2,A4)   A5=DI\DR
A43 04842 0BFC0BFC (00547)          MOV(IOA,M4)                             DI TO M4
A44 04844 4A724A72 (00548)          MOV(A2),SUB(A3,A2)                      A2=CICOS2X-CRSIN2X
```

```
                     (00549) ;                                                      \CISIN2X+CRCOS2X
                     (00550)
                     (00551)
A45 04846 8590A590 (00552)         MOV(A0),MUL(M3,M4)\MOV(A0),MULN(M3,M4)    A0=DRSIN3X\DRCOS3X
A46 04848 427B427B (00553)         MOV(FX0),ADD(A3,A2)                       FX=RI\RR
A47 0484A 0B560B56 (00554)         MOV(FX1,A6)                               A6=RR\RI
A48 0484C 0BFB0BFB (00555)         MOV(IOA,M0)                               BI TO M0
A49 0484E 47D447D4 (00556)         MOV(A4),ADD(A6,A7)                        A4=PI\PR
                     (00557)
                     (00558)
A4A 04850 8431A431 (00559)         MOV(A1),MUL(M0,M5)\MOV(A1),MULN(M0,M5)    A1=DICOS3X\DISIN3X
A4B 04852 483C103C (00560)         MOV(OO),SUB(A1,A0)\MOV(OO),ADD(A1,A0)     OO=ZR\ZI
A4C 04854 0BFC0BFC (00561)         MOV(IOA,M4)                               BR TO M4
A4D 04856 40904090 (00562)         MOV(A0),SUB(A4,A5)                        A0=DICOS3X-DRSIN3X
                     (00563) ;                                                  \DISIN3X+DRCOS3X
                     (00564)
                     (00565)
                     (00566)
A4E 04858 A491B491 (00567)         MOV(A1),MULN(M1,M4)\MOV(A1),MUL(M1,M4)    A1=BICOSX\BISINX
A4F 0485A 4FDC4FDC (00568)         MOV(OO),SUB(A6,A7)                        OO=YI\YR
A50 0485C 0BFB0BFB (00569)         MOV(IOA,M0)                               CR TO M0
A51 0485E 459C459C (00570)         MOV(OO),ADD(A4,A5)                        OO=XR\XI
                     (00571)
                     (00572)
A52 04860 A4528452 (00573)         MOV(A2),MULN(M0,M6)\MOV(A2),MUL(M0,M6)    A2=BRSINX\BRCOSX
A53 04862 495C423C (00574)         MOV(OO),SUB(A2,A1)\MOV(OO),ADD(A1,A2)     OO=WR\WI
A54 04864 0BFC0BFC (00575) CR4FF   MOV(IOA,M4)                               CI TO M4
A55 04866 41114831 (00576)         MOV(A1),ADD(A0,A1)\MOV(A1),SUB(A1,A0)     A1=BRSINX-BICOSX
                     (00577) ;                                                  \BRCOSX+BISINX
                     (00578)
                     (00579)
A56 04868 8512A512 (00580)         MOV(A2),MUL(M2,M4)\MOV(A2),MULN(M2,M4)    A2=CRSIN2X\CRCOS2X
A57 0486A 0BF34037 (00581)         MOV(IOA,A3)\MOV(A7),ADD(A1,A0)            A3=AI \ A7=SI
A58 0486C 49170BF3 (00582)         MOV(A7),SUB(A0,A1)\MOV(IOA,A3)            A7=SR \ A3=AR
A59 0486E 90280040 (00583)         JUMPC(CR4FB,AF0),CLEAR                    AF1;STAGE DONE
A5A 04870 90290039 (00584)         JUMPC(CR4FC,AF1),CLEAR                    AF0;COSINES USED
                     (00585)
                     (00586)
                     (00587) ; CR4F-PIPELINE CLEANUP
A5B 04872 0BB40BB4 (00588)         MOV(P,A4)                                 A4=CICOS2X\CISIN2X
                     (00589)
                     (00590)
A5C 04874 4A954455 (00591)         MOV(A5),SUB(A4,A2)\MOV(A5),ADD(A2,A4)     A5=QI\QR
A5D 04876 4A724A72 (00592)         MOV(A2),SUB(A3,A2)                        A2=CICOS2X-CRSIN2X
```

```
                       (00593) ;                                    \CISIN2X+CRCOS2X
                       (00594)
A5E 04878 427B427B (00595)      MOV(FX0),ADD(A3,A2)              FX=RI\RR
A5F 0487A 08560856 (00596)      MOV(FX1,A6)                      A6=RR\RI
                       (00597)
A60 0487C 47D447D4 (00598)      MOV(A4),ADD(A6,A7)               A4=PI\PR
A61 0487E 4D9C0000 (00599)      MOV(DQ),SUB(A4,A5)\NOP           DQ=ZR
A62 04880 00004D9C (00600)      NOP\MOV(DQ),SUB(A4,A5)           DQ=ZI
A63 04882 4FDC0000 (00601)      MOV(DQ),SUB(A6,A7)\NOP           DQ=YI
A64 04884 00004FDC (00602)      NOP\MOV(DQ),SUB(A6,A7)           DQ=YR
A65 04886 204A204A (00603)      SET(AF2)                         APS/OTPT STAGE DN
A66 04888 459C0000 (00604)      MOV(DQ),ADD(A4,A5)\NOP           DQ=XR
A67 0488A 0000459C (00605)      NOP\MOV(DQ),ADD(A4,A5)           DQ=XI
A68 0488C 089C0000 (00606)      MOV(R,DQ)\NOP                    DQ=WR
A69 0488E 0000089C (00607)      NOP\MOV(R,DQ)                    DQ=WI
                       (00608)
A6A 04890 900B002A (00609)      JUMPC(CR4FSA,AF3)
                       (00610)
                       (00611) ;
```

```
                   (00612) '          EVEN-ODD SEPARATE
                   (00613) ;
                   (00614) ;
                   (00615) ; X(K)=A*[W(K)+W'(N-K)]
                   (00616) ; Z(K)=-J*A*[W(K)-W'(N-K)]
                   (00617) ; X(0)=2*A*[RW(0)+JRW(N/2)]
                   (00618) ; Z(0)=2*A*[IW(0)+JIW(N/2)]
                   (00619) ;
                   (00620) ; RX(K)=A(RW(K)+RW(N-K))
                   (00621) ; IX(K)=A(IW(K)-IW(N-K))
                   (00622) ; RZ(K)=A(IW(K)+IW(N-K))
                   (00623) ; IZ(K)=A(RW(N-K)-RW(K))
                   (00624) ;
                   (00625) ;
A6B 04B92 0BF80BF8 (00626)        MOV(IOA, M0)                                    M0=A
A6C 04B94 0BF00BF0 (00627)        MOV(IOA, A0)                                    A0=RW(N/2)
A6D 04B96 0BF10BF1 (00628)        MOV(IOA, A1)                                    A1=IW(N/2)
A6E 04B98 0BF20BF2 (00629)        MOV(IOA, A2)                                    A2=RW(0)
A6F 04B9A 0BF30BF3 (00630)        MOV(IOA, A3)                                    A3=IW(0)
A70 04B9C 42404360 (00631)        ADD(A2, A2)\ADD(A3, A3)
A71 04B9E 400C412C (00632)        MOV(M4),ADD(A0,A0)\MOV(M4),ADD(A1,A1)           M4=2RW(0)\2IW(0)
A72 04BA0 84008400 (00633)        MUL(M0, M4)
A73 04BA2 0B800B80 (00634) #1     MOV(R, NULL)
A74 04BA4 0BF40BF4 (00635)        MOV(IOA, A4)                                    A4=IW(N-K)
A75 04BA6 0BF50BF5 (00636)        MOV(IOA, A5)                                    A5=RW(K)
A76 04BA8 0BF60BF6 (00637)        MOV(IOA, A6)                                    A6=RW(N-K)
A77 04BAA 0BF70BF7 (00638)        MOV(IOA, A7)                                    A7=IW(K)
A78 04BAC 46A0478D (00639)        MOV(M5),ADD(A5,A6)\MOV(M5),ADD(A4,A7)           M5=IW(K)-IW(N-K)
                   (00640) ;                                                        \RW(N-K)-RW(K)
A79 04BAE 843C843C (00641)        MOV(OO), MUL(M0, M5)                            OO=RX(K)\RZ(K)
A7A 04BB0 4CEC4DCC (00642)        MOV(M4),SUB(A7,A4)\MOV(M4),SUB(A6,A5)           M4=RW(K)+RW(N-K)
                   (00643) ;                                                        \IW(K)+IW(N-K)
A7B 04BB2 841C841C (00644)        MOV(OO), MUL(M0, M4)                            OO=IX(K)\IZ(K)
A7C 04BB4 901C0073 (00645)        JUMPC(#1, EO)
A7D 04BB6 20322032 (00646)        CLEAR(RA)
A7E 04BB8 00000000 (00647)        NOP
A7F 04BBA 10000000 (00648)        JUMP(CSM2$SA)
                   (00649) ;
          00000080 (00650)        CR4$SZ = #A-CSM2$SA
    04BBC          (00651)        END
                   (00652) ;
                   (00653)
                   (00654)
                   (00655)
```

EVEN-ODD SEPARATE

```
 (00656)
-(00657)
 (00658)
 (00659) ;
```

```
                  (00660) *   APS PROGRAMS
                  (00661) ;
                  (00662) ;
                  (00663) ; START OF HEADER BLOCK
                  (00664) ;
                  (00665)          EVEN                    START ON WORD BOUNDARY
04BBC 000049C4    (00666)          ADDR CSMS1              PTR TO CONSTR INSTR BLOCK(NONE)
04BBE 00004BC4    (00667)          ADDR CSMS+2*CSMSS       PTR TO SCALAR BLOCK (NONE)
04BC0 0000        (00668)          DATA 0                  NO SCALARS
04BC1 0100        (00669)          DATA CR4ASZ             MODULE SIZE
04BC2 00000000    (00670)          ADDR CR4ASA             PTR TO CHAIN ANCHOR
                  (00671)          EVEN                    END OF BOUNDARY
                  (00672) ;
                  (00673) ;
```

```
                      (00674) '          CSM - COMPLEX FFT SCRAMBLE (P0 - INPUT)
                      (00675) ; APS PROGRAM PROVIDING SCRAMBLE FOR COMPLEX FFT
                      (00676) ; MAY BE USED WITH THE MAP-300 APU PROGRAMS
                      (00677) ; CSM2(Y,U), CSM4F(Y,U), CSM4I(Y,U)
                      (00678) ;
                      (00679) ; RESTRICTIONS
                      (00680) ; IN PLACE OPERATION NOT PERMITTED
                      (00681) ; BUFFER SIZES MUST BE 1024 OR LESS
                      (00682) ; Y BUFFER MUST BE COMPACT 32 BIT FLOATING
                      (00683) ;
                      (00684) ;
                      (00685) ; BINDING PARAMETERS
                      (00686) ;
                      (00687) ;          N=# OF POINTS IN FFT (USIZE)
                      (00688) ;          HU=USEP*N/2
                      (00689) ;          QU=HU/2
                      (00690) ; APS-INPUT ADDRESS SEQUENCE
                      (00691) ; RU(K), RU(K+N/2), IU(K+N/2), IU(K), IU(K+N/4)
                      (00692) ; IU(K+3N/4), RU(K+3N/4), RU(K+N/4)], FOR 0<=K<N/4
                      (00693) ; THUS PROVIDING REVERSAL OF TWO BITS
                      (00694) ;
                      (00695) ; APS-OUTPUT ADDRESS SEQUENCE
                      (00696) ; RW(J), RW(J+1), IW(J), IW(J+1), RW(J+2),
                      (00697) ; RW(J+3), IW(J+2), IW(J+3)
                      (00698) ; WHERE J= BIT REVERSAL OF K
                      (00699) ; THE DIFFERENCE, D(K) = J(K+1)-J(K) IS
                      (00700) ; PROVIDED BY THE P3 SUBROUTINE
                      (00701) ;
                      (00702) ;
                      (00703) CSMS    BEGIN APS(CSM)
                      (00704) ;
A00 048C4 00202540    (00705) CSMSS   JSN(CSM0,P2)
                      (00706) ;
A01 048C6 02C00000    (00707) CSML6S  LOAD(BR0,MSS,L,TF)          INPT RU(0) [UBASE BOUND]
A02 048C8 04500000    (00708) CSML0S  LOAD(BR1,MSS)               [USIZE-1 BOUND]
A03 048CA 06300672    (00709)         JUMP(CSMF,RA),SET           TURN ON APU
                      (00710) ;
A04 048CC 08820000    (00711) CSML    SUB(BR0,MSS,TF)             INPT RU(K+N/4) [HU BOUND]
                      (00712) ;
A05 048CE 0A820000    (00713) CSML1S  SUB(BR0,MSS,TF)             INPT RU(K) [QU-USEP BOUND]
A06 048D0 0CKA0000    (00714) CSMF    ADD(BR0,MSS,TF)             INPT RU(K+N/2) [HU BOUND]
A07 048D2 0EKA0002    (00715)         ADD(BR0,2,TF)               INPT IU(K+N/2)
A08 048D4 10820000    (00716) CSML2S  SUB(BR0,MSS,TF)             INPT IU(K) [HU BOUND]
                      (00717) ;
```

```
A09 04BD6 12BA0000 (00718) CSML3S  ADD(BRO,KSS,TF)            INPT IU(K+N/4) [OU BOUND]
A0A 04BD8 14BA0000 (00719) CSML4S  ADD(BRO,MSS,TF)            INPT IU(K+3N/4) [HU BOUND]
A0B 04BDA 16B20002 (00720)         SUB(BRO,2,TF)              INPT RU(K+3N/4)
                   (00721) ;
A0C 04BDC 1B1904B4 (00722)         SUBL(BR1,4),JUMPP(CSML)
                   (00723) ;
A0D 04BDE 1AB20000 (00724) CSML5S  SUB(BRO,MSS,TF)            INPT RU(LAST) [HU BOUND]
A0E 04BE0 1C304E77 (00725)         JUMP(CR4AE,WI),SET
                   (00726) ;
```

```
                           (00727) *          CSM-SCRAMBLE SUBROUTINE (P3 - OUTPUT)
                           (00728) ;
                           (00729) ; DATA POINT ADDRESS AT ENTRY 4*[J(K)-N]+WBASE
                           (00730) ; DATA OUTPUT ADDRESS GENERATED [4J(K+1)]+WBASE
                           (00731) ;
                           (00732) ; ITERATION EQUATION, J=J(K)=K,BIT REVERSED
                           (00733) ; 4J(K+1)=4*[J(K)-N]+DM
                           (00734) ; WHERE M=NUMBER OF TRAILING 1'S IN (K)
                           (00735) ;
                           (00736) ; BINDING CONSTANTS
                           (00737) ;
                           (00738) ;          D0=4*(3*N/2)
                           (00739) ;          D1=D0/2
                           (00740) ;          D2=D1/2
                           (00741) ;          D3=D2/2
                           (00742) ;          D4=D3/2
                           (00743) ;          D5=D4/2
                           (00744) ;          D6=D5/2
                           (00745) ;          D7=D6/2
                           (00746) ;;
                           (00747) ;
A0F 04BF2 1F107840 (00748) SCRM    JSN(ANGLE,P1)                  LOADS P1 FOR CR4A
                           (00749) ;
A10 04BF4 20BF0000 (00750) SCRM0   ADD(BW0,MSS,TF,C)              [D0 BOUND]
A11 04BF6 22BF0000 (00751) SCRM1S  ADD(BW0,MSS,TF,C)              [D1 BOUND]
A12 04BF8 24BF0000 (00752) SCRM2S  ADD(BW0,MSS,TF,C)              [D0 BOUND]
A13 04BFA 26BF0000 (00753) SCRM3S  ADD(BW0,MSS,TF,C)              [D2 BOUND]
A14 04BFC 28BF0000 (00754) SCRM4S  ADD(BW0,MSS,TF,C)              [D0 BOUND]
A15 04BFE 2ABF0000 (00755) SCRM5S  ADD(BW0,MSS,TF,C)              [D1 BOUND]
A16 04BF0 2CBF0000 (00756) SCRM6S  ADD(BW0,MSS,TF,C)              [D0 BOUND]
                           (00757) ;
A17 04BF2 2E201AF8 (00758)         JUMPS(SCRM4,AF0),CLEAR
A18 04BF4 30BF0000 (00759) SCRM7S  ADD(BW0,MSS,TF,C)              [D3 BOUND]
A19 04BF6 32301068 (00760)         JUMP(SCRM0,AF0),SET
                           (00761) ;
A1A 04BF8 34201DF9 (00762) SCRM4   JUMPS(SCRM5,AF1),CLEAR
A1B 04BFA 36BF0000 (00763) SCRM8S  ADD(BW0,MSS,TF,C)              [D4 BOUND]
A1C 04BFC 38301069 (00764)         JUMP(SCRM0,AF1),SET
                           (00765) ;
                           (00766) ;
A1D 04BFE 3A2020FA (00767) SCRM5   JUMPS(SCRM6,AF2),CLEAR
A1E 04900 3CBF0000 (00768) SCRM9S  ADD(BW0,MSS,TF,C)              [D5 BOUND]
A1F 04902 3E30106A (00769)         JUMP(SCRM0,AF2),SET
                           (00770) ;
```

```
 A20 04904 402023EB (00771) SCRM6    JUMPS(SCRM7,AF3),CLEAR
 A21 04906 428E0000 (00772) SCRM10$ ADD(BW0,MSS,TF,C)            [D6 BOUND]
 A22 04908 4430106B (00773)          JUMP(SCRM0,AF3),SET
                    (00774) ;
 A23 0490A 46BE0000 (00775) SCRM7    ADD(BW0,MSS,TF,C)            [D7 BOUND]
 A24 0490C 48001060 (00776)          JUMP(SCRM0)
                    (00777) ;
```

```
                       (00778) '         CSM-SCRAMBLE SUBROUTINE (OUTPUT - P2)
                       (00779) ;
                       (00780) ;
A25 0490E 4A300F40     (00781) CSMO    JSN(SCRM,P3)
A26 04910 4CC00000     (00782) CSMOIS  LOAD(BWO,MSS,L,TE)          OTPT RW(0) [WBASE BOUND]
A27 04912 4E112953     (00783)         MOVB(BW1,BRI),JUMP(CSMOE)   BW1=WSIZE-1
                       (00784) ;
A28 04914 50060000     (00785) CSMOL   SUB(BWO,MSS,C)              [4N+12 BOUND]
                       (00786) ;
                       (00787) ; PRIOR TO JUMP TO P3,BWO=4J(K)-4N
                       (00788) ; SCRAMBLE SUBROUTINE OUTPUTS RW(J)
                       (00789) ; LEAVING BWO=4J(K+1)
                       (00790)
A29 04916 52BA0004     (00791) CSMOE   ADD(BWO,4,TE)               OTPT RW(J+1)
A2A 04918 54B20002     (00792)         SUB(BWO,2,TE)               OTPT IW(J)
A2B 0491A 56BA0004     (00793)         ADD(BWO,4,TE)               OTPT IW(J+1)
                       (00794) ;
A2C 0491C 58BA0004     (00795)         ADD(BWO,4,TE)               OTPT IW(J+2)
A2D 0491E 5ABA0004     (00796)         ADD(BWO,4,TE)               OTPT IW(J+3)
A2E 04920 5CB20006     (00797)         SUB(BWO,6,TE)               OTPT RW(J+2)
A2F 04922 5EBA0004     (00798)         ADD(BWO,4,TE)               OTPT RW(J+3)
                       (00799) ;
A30 04924 601128B4     (00800)         SUBL(BW1,4),JUMPP(CSMOL)
                       (00801) ;
```

```
'          SUCCESSIVE RADIX-4 STAGES (OUTPUT - P2)
;          PROGRAM ASSUMES SCRAMBLE COMPLETED


; 12/14/77
; SCRAMBLE LEAVES APS AS FOLLOWS
; INPUT - LAST COMMAND,JUMP(CR4AF,WI1,SET
; INPUT-P1 LOCATED AT ANGLE
; OUTPUT - ACTIVE, IN P2
;
; SS=STAGE SEPARATION, DATA SEPARATION A B C D
; STARTING VALUES(/4)ARE
; SSI=1, SCRAMBLE ONLY PRECEEDING          N=4^M
; SSI=2, SCRAMBLE PLUS RADIX2 PRECEEDING N=2*4^M
; SSI=3, SCRAMBLE PLUS RADIX3 PRECEEDING N=3*4^M
; SSI=4, SCRAMBLE PLUS RADIX4 PRECEEDING N=4*4^M
; SSI=6, SCRAMBLE PLUS RADIX6 PRECEEDING N=6*4^M
;
;
; COSINE TABLE IS A REAL BUFFER WITH CONTENTS:
;     CT(K)=COS(2*PI*K/CSIZE)
; RESTRICTION.
; CSIZE MUST BE MULTIPLE OF N, FFT SIZE
;
; COSINE TABLE BINDING PARAMETERS
;
;          BPI=CSEP*(CSIZE/4)             90 DEG SEPARATION
;
; REGISTER USAGE
;          BR0/BW0                        DATA ADDRESSES
;          BR1/BW1                        # OF USES OF A COSINE, COUNTER
;          BW2                            # OF COSINES USED, COUNTER
;          BW3                            STAGE SEPARATION
;          BR2                            SEP BETWEEN COSINES WITHIN A SET
;          BR3                            SEP BETWEEN SETS OF COSINES
         EJECT
```

```
                        (00838)
A31 04926 62700000 (00839) CR4A01 LOAD(BW3,MSS)                 [SSI BOUND]
                        (00840) ;
                        (00841) ;  CR4A-APS OUTPUT PROGRAM-STAGE INITIALIZATION
                        (00842) ;
                        (00843) ;
A32 04928 6431002F (00844) CR4A02  ADDB(BW3,BW3)
A33 0492A 6631002F (00845)         ADDB(BW3,BW3)               SET SEPARATION FOR STAGE
A34 0492C 68400000 (00846) CR4A1S  LOAD(BW0,MSS)               SET BW0=WB-4 [WBASE BOUND]
A35 0492E 6A210016 (00847)         MOVB(BW2,BW3)
A36 04930 6C090010 (00848)         MOVB(BR0,BW0)               SET UP INPUT BASE
A37 04932 6E200037 (00849)         CLEAR(WI)                   START UP INPUT
                        (00850)
A38 04934 70500000 (00851) CR4A03  LOAD(BW1,MSS)               SET BUTTERFLY COUNT [USIZE-1 BOUND]
A39 04936 720A0000 (00852) CR4A2S  ADD(BW0,MSS)                SET STARTING ADDRESS [4N+4 BOUND]
                        (00853)
                        (00854)
A3A 04938 74810026 (00855) CR4A04  SUBB(BW0,BW3,TF)            ZR
A3B 0493A 768A0002 (00856)         ADD(BW0,2,TF)               ZI
A3C 0493C 78810026 (00857)         SUBB(BW0,BW3,TF)            YI
A3D 0493E 7A820002 (00858)         SUB(BW0,2,TF)               YR
A3E 04940 7C810026 (00859)         SUBB(BW0,BW3,TF)            XR
A3F 04942 7E8A0002 (00860)         ADD(BW0,2,TF)               XI
A40 04944 80810026 (00861)         SUBB(BW0,BW3,TF)            WI
A41 04946 82820002 (00862)         SUB(BW0,2,TF)               WR
                        (00863) ;TEST FOR NEW COSINES, ELSE OUTPUT NEXT 4 POINTS
                        (00864) ;
A42 04948 84113AA6 (00865)         SUBB(BW1,BW3),JUMPP(CR4A04)
                        (00866) ;TEST STAGE DONE, ELSE GET NEW COSINES
                        (00867) ;
A43 0494A 86203BAA (00868)         JUMPC(CR4A03,AF2),CLEAR
                        (00869) ;
                        (00870) ;STOPPING SHORT CHECK IS HERE
                        (00871) ;
A44 0494C 88500000 (00872) CR4A13S LOAD(BW1, MSS)              [FFTSIZE-1 BOUND]
A45 0494E 8A1132A6 (00873)         SUBB(BW1, BW3), JUMPP(CR4A02)
```

```
                    (00874) *          GENERATE OUTPUT ADDRESSES FOR EVEN-ODD SEPARATE
                    (00875) ;
                    (00876) ;
                    (00877) ; W BUFFER CONTAINS FFT OF X+JZ
                    (00878) ; TWO REAL FFT'S ARE EXTRACTED AS FOLLOWS
                    (00879) ;   X(K)=A*[W(K)+W'(N-K)]
                    (00880) ;   Z(K)=A*[W(K)-W'(N-K)]
                    (00881) ; WHERE, W'=CONJUGATE OF W
                    (00882) ;
                    (00883) ; RX(0)=RW(0)
                    (00884) ; IX(0)=RW(N/2)
                    (00885) ; RZ(0)=IW(0)
                    (00886) ; IZ(0)=IW(N/2)
                    (00887) ;
                    (00888) ; X(K) IS STORED IN Y(K)
                    (00889) ; Z(K) IS STORED IN Y(K+N/2)
                    (00890) ;
                    (00891) ; RX(K)=RW(K)+RW(N-K), IX(K)=IW(K)-IW(N-K)
                    (00892) ; RZ(K)=RW(K)-RW(N-K), IZ(K)=IW(K)+IW(N-K)
                    (00893) ;
                    (00894) ; THE OUTPUT ADDRESS SEQUENCE IS:
                    (00895) ;   RX(0), RZ(0), IX(0), IZ(0),
                    (00896) ;   RX(K), RZ(K), IX(K), IZ(K)
                    (00897) ;
                    (00898) ;
A46 04950 RCC00000 (00899) FOS01   LOAD(RW0, MSS, TF)            <RX(0) [YBASE BOUND]
A47 04952 8F110010 (00900)         MOVB(BW1, BW0)
A48 04954 909A0000 (00901) FOS02   ADD(BW1, MSS, TF)             <RZ(0) [2N BOUND]
A49 04956 92600000 (00902) FOS03   LOAD(BW2, MSS)                [USIZE-2 BOUND]
A4A 04958 94BA0002 (00903) FOS04   ADD(BW0, 2, TF)               <X(K)
A4B 0495A 969A0002 (00904)         ADD(BW1, 2, TF)               <Z(K)
A4C 0495C 98214AB1 (00905)         SUBL(BW2, 1), JUMPP(FOS04)
A4D 0495E 9A203470 (00906)         JUMP(CR4A1S, R0), CLEAR       HALT APS OUTPUT
                    (00907) ;
                    (00908)
```

```
                      (00909) *          SUCCESSIVE RADIX-4 STAGES (INPUT - P0)
                      (00910)
A4E 04960 9C300037    (00911) CR4A1    SET(WI)
                      (00912) ;STAGE INITIALIZATION
                      (00913) ;
A4F 04962 9E600000    (00914) CR4AF    LOAD(BR2,0)                  SET COSINE VALUE=0
A50 04964 A03D0015    (00915)          MOVB(BF3,BR2,C)
                      (00916) ;
                      (00917) ; ANGLE SUBROUTINE,P1,INSERTS COSINE SEPARATION
                      (00918) ; FOR STAGE INTO BF3
                      (00919)
                      (00920)
A51 04966 A2215871    (00921)          SUBL(BW2,1),JUMP(CR4A3)      BW2=#OF COSINES-1
                      (00922)
A52 04968 A4890032    (00923) CR4A2    SUBL(BRO,2,TF)               AR
                      (00924) ;COSINE ENTRY
                      (00925) ;
A53 0496A A6500000    (00926) CR4A4S   LOAD(BR1,MSS,L)              [CHASE BOUND]
A54 0496C A829002F    (00927)          ADDB(BR2,BR3)                BR2=NEXT ANGLE
                      (00928)
A55 0496E AA99002D    (00929)          ADDB(BR1,BR2,TF)             COSX
A56 04970 AC9A0000    (00930) CR4A5S   ADD(BR1,MSS,TF)              SINX [HPI BO ND]
A57 04972 AE99002D    (00931)          ADDB(BR1,BR2,TF)             SIN2X
A58 04974 B0920000    (00932) CR4A6S   SUB(BR1,MSS,TF)              COS2X [HPI BOUND]
A59 04976 B299002D    (00933)          ADDB(BR1,BR2,TF)             COS3X
A5A 04978 B49A0000    (00934) CR4A7S   ADD(BR1,MSS,TF)              SIN3X [HPI BOUND]
A5B 0497A B6DA0000    (00935) CR4A3    ADD(BRO,MSS)                 SET BRO TO 4N+COS# [4N+4 BOUND]
A5C 0497C B8500000    (00936) CR4A8S   LOAD(BR1,MSS)                SET COSINE USE COUNTER [USIZE-1 BOUND]
                      (00937)
                      (00938) ; CR4A-APS BUTTERFLY INPUT
                      (00939) ;
                      (00940)
A5D 0497E BAB90026    (00941) CR4A4    SUBB(BRO,BW3,TF)             DR
A5E 04980 BCB9003A    (00942)          ADDL(BRO,2,TF)               DI
A5F 04982 BEB90026    (00943)          SUBB(BRO,BW3,TF)             BI
A60 04984 C0890032    (00944)          SUBL(BRO,2,TF)               BR
A61 04986 C2B90026    (00945)          SUBB(BRO,BW3,TF)             CR
A62 04988 C489003A    (00946)          ADDL(BRO,2,TF)               CI
A63 0498A C6B90026    (00947)          SUBB(BRO,BW3,TF)             AI
                      (00948)
                      (00949) ; TEST IF NEW COSINE NEEDED, ELSE INPUT NEXT 4 POINTS
                      (00950) ;
A64 0498C C81976A6    (00951)          SUBB(BR1,BW3),JUMPP(CR4A5)
A65 0498E CA300028    (00952)          SET(AFO)                     TELL APU COSINES COMING
```

```
                    (00953) ; TEST IF STAGE DONE, ELSE GET NEW COSINES
                    (00954)
A66 04990 CC215284 (00955)          SUBL(BW2,4),JUMPP(CR4A2)
A67 04992 CE300029 (00956)          SET(AF1)                      TELL APU STAGE DONE
                    (00957) ;********* CHANGE VALUE HERE TO STOP SHORT ***********
                    (00958) ;TO STOP SHORT 1 STAGE, BIND USIZE/4-1 HERE
A68 04994 D0500000 (00959) CR4A9$  LOAD(BR1,MSS)                 (FFTSIZE-1 BOUND)
A69 04996 D2890032 (00960)          SUBL(BR0,2,TF)                LAST DATA POINT
                    (00961)
                    (00962) ; TEST IF FFT DONE, ELSE START NEXT STAGE
                    (00963)
A6A 04998 D4194FA6 (00964)          SUBB(BR1,BW3),JUMPP(CR4A1)    GO BACK
                    (00965) ;
```

```
                    (00966) '         GENERATE INPUT ADDRESSES FOR EVEN-ODD SEPARATE
                    (00967) ;
                    (00968) ;
                    (00969) ; INPUT SEQUENCE:
                    (00970) ;  SCALAR A,
                    (00971) ;  RW(N/2), IW(N/2), RW(0), IW(0),
                    (00972) ;  [IW(N-K), RW(K), RW(N-K), IW(K)]
                    (00973) ;
                    (00974) ;
A6B 0499A D6300028  (00975)           SET(AE3)                   SIGNAL APU TO DO EOS
A6C 0499C DBC20000  (00976) EOS1      LOAD(BRO, MSS(1), TE)         <SA [SCALAR A BOUND]
A6D 0499E DA400000  (00977) EOS2      LOAD(BRO, MSS)             RW(0) [WBASE BOUND]
A6E 049A0 DC190011  (00978)           MOVB(BR1, BRO)
A6F 049A2 DEBA0000  (00979) EOS3      ADD(BRO, MSS, TE)          <RW(N/2) [2N BOUND]
A70 049A4 F0BA0002  (00980)           ADD(BRO, 2, TE)            <IW(N/2)
A71 049A6 F2890013  (00981)           MOVB(BRO, BR1, TE)         <RW(0)
A72 049A8 F41A0000  (00982) EOS4      ADD(BR1, MSS)              RW(N) [4N BOUND]
A73 049AA F6BA0002  (00983) EOS5      ADD(BRO, 2, TE)            <W(K)
A74 049AC F8920002  (00984)           SUB(BR1, 2, TE)            <W(N-K)
A75 049AE FA007360  (00985)           JUMP(EOS5)
                    (00986)
A76 049B0 FCB90032  (00987) CR4A5     SUBL(BRO,2,TE)             AR
A77 049B2 FE005D60  (00988)           JUMP(CR4A4)
                    (00989)
```

```
                          (00990) *          ANGULAR SEPARATION SUBROUTINE (INPUT - P1)
                          (00991) ; S1ANG=PPI/SST
                          (00992) ; S2ANG=S1ANG/4
                          (00993) ; S3ANG=S2ANG/4
                          (00994) ; S4ANG=S3ANG/4
                          (00995) ; S5ANG=S4ANG/4
                          (00996) ; S6ANG=S5ANG/4
                          (00997) ; S7ANG=S6ANG/4
                          (00998)
                          (00999)
A78 049B4 F0300030 (01000) ANGLE   SET(R0)
A79 049B6 F23F0000 (01001) ANGL1S  ADD(BR3,MSS,C)               [S1ANG BOUND]
A7A 049B8 F43F0000 (01002) ANGL2S  ADD(BR3,MSS,C)               [S2ANG BOUND]
A7B 049BA F63F0000 (01003) ANGL3S  ADD(BR3,MSS,C)               [S3ANG BOUND]
A7C 049BC F83F0000 (01004) ANGL4S  ADD(BR3,MSS,C)               [S4ANG BOUND]
A7D 049BE FA3F0000 (01005) ANGL5S  ADD(BR3,MSS,C)               [S5ANG BOUND]
A7E 049C0 FC3F0000 (01006) ANGL6S  ADD(BR3,MSS,C)               [S6ANG BOUND]
A7F 049C2 FE3F0000 (01007) ANGL7S  ADD(BR3,MSS,C)               [S7ANG BOUND]
                          (01008)
                          (01009) ;
          00000000 (01010)  CR4ASA=#C                           ASSIGN VALUE TO CHAIN
    049C4                 (01011)         END                    #A-1  END OF MODULE
                          (01012) ;
          000049C4 (01013) CSMSI   #L=#L+2*0
                          (01014) ;
          00000100 (01015)  CR4ASZ=#L-CSMS
                          (01016) ;
                          (01017) *  DEFINE TOP OF MODULE
                          (01018) *
          000049C4 (01019) TOESCUR = #L
                          (01020) *
```

SYMBOL TABLE

```
                (01021) 'SYMBOL TABLE
      049C4     (01022)         END
```

SYMBOL TABLE

```
AFDTS:       008FB (00046) (00047) (00082) (00087)
AFDTSORG:    008FB (00047) (00335) (00339)
ANGL1S:      00079 (00258) (01001)
ANGL2S:      0007A (00261) (0100[illegible])
ANGL3S:      0007B (00264) (010[illegible])
ANGL4S:      0007C (00267) (01004)
ANGL5S:      0007D (00270) (01005)
ANGL6S:      0007E (00273) (01006)
ANGL7S:      0007F (00276) (01007)
ANGLE:       00078 (00748) (01000)
APSENDRO:    00F63 (00064) (00356)
APSBSL:      0024D (00061) (00243)
BCTSAD:      00604 (00054) (00112) (00224)
BCTSAT:      00686 (00055) (00107)
BCTSBA:      00582 (00053) (00219) (00290) (00316) (00328)
CR4SSZ:      00080 (00378) (00650)
CR4ASA:      00000 (00670) (01010)
CR4ASZ:      00100 (00669) (01015)
CR4A1:       0004F (00911) (00964)
CR4A1S:      00034 (00300) (00846) (00906)
CR4A13S:     00044 (00117) (00872)
CR4A2:       00052 (00923) (00955)
CR4A2S:      00039 (00200) (00852)
CR4A3:       0005B (00201) (00921) (00935)
CR4A4:       0005D (00941) (00988)
CR4A4S:      00053 (00220) (00926)
CR4A5:       00076 (00951) (00987)
CR4A5S:      00056 (00232) (00930)
CR4A6S:      0005B (00233) (00932)
CR4A7S:      0005A (00234) (00934)
CR4A8S:      0005C (00115) (00936)
CR4A9S:      0006B (00116) (00959)
CR4AF:       0004F (00725) (00914)
CR4AD1:      00031 (00246) (00250) (00839)
CR4AD2:      00032 (00844) (00873)
CR4AD3:      0003B (00113) (00851) (00868)
CR4AD4:      0003A (00855) (00865)
CR4FB:       00040 (00544) (00583)
CR4FC:       00039 (00534) (00584)
CR4FF:       00054 (00530) (00575)
CR4FS:       0002B (00416) (00508)
CR4FSA:      0002A (00510) (00609)
CSMS:        048C4 (00084) (00089) (00113) (00114) (00115) (00116) (00117) (00120) (00148) (00151)
                   (00158) (00159) (00160) (00161) (00164) (00165) (00168) (00171) (00174) (00177)
```

SYMBOL TABLE

```
                 (00180) (00183) (00190) (00191) (00194) (00200) (00201) (00204) (00211) (00220)
                 (00232) (00233) (00234) (00246) (00250) (00258) (00261) (00264) (00267) (00270)
                 (00273) (00276) (00291) (00296) (00300) (00317) (00329) (00361) (00362) (00363)
                 (00364) (00365) (00667) (00703) (01015)
CSMSI:     049C4 (00666) (01013)
CSMSS:     00000 (00667) (00705)
CSM2S:     0478C (00083) (00088) (00395)
CSM2SSA:   00000 (00377) (00398) (00648) (00650)
CSM2F:     00003 (00399) (00403)
CSM2L:     00002 (00401) (00411)
CSM4F:     0000D (00398) (00434)
CSM4FS:    00010 (00439) (00456)
CSMF:      00006 (00362) (00709) (00714)
CSML:      00004 (00361) (00711) (00722)
CSML0S:    00002 (00114) (00708)
CSML1S:    00005 (00151) (00713)
CSML2S:    00008 (00363) (00716)
CSML3S:    00009 (00148) (00718)
CSML4S:    0000A (00364) (00719)
CSML5S:    0000D (00365) (00724)
CSML6S:    00001 (00317) (00707)
CSM0:      00025 (00705) (00781)
CSM01S:    00026 (00291) (00782)
CSM0F:     00029 (00783) (00791)
CSM0L:     00028 (00204) (00785) (00800)
FOS1:      0006C (00211) (00976)
FOS2:      0006D (00296) (00977)
FOS3:      0006F (00190) (00979)
FOS4:      00072 (00194) (00982)
FOS5:      00073 (00983) (00985)
FOS01:     00046 (00329) (00899)
FOS02:     00048 (00191) (00901)
FOS03:     00049 (00120) (00902)
FOS04:     0004A (00903) (00905)
FF2RS:     00006 (00079) (00082)
FF2RBS:    00007 (00080) (00087)
FFTSSFT:   04690 (00085) (00103)
FLGSC0:    00004 (00058)
FLGSC1:    00005 (00059) (00247) (00251)
FLGSSFT:   00020 (00057) (00251)
GSFLGS:    04780 (00247) (00251) (00351) (00359)
HS:        00001 (00051) (00052) (00103) (00107) (00113) (00114) (00115) (00116) (00117) (00120)
                 (00148) (00151) (00158) (00159) (00160) (00161) (00164) (00165) (00168) (00171)
                 (00174) (00177) (00180) (00183) (00190) (00191) (00194) (00200) (00201) (00204)
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                   (00208) (00211) (00212) (00232) (00233) (00234) (00246) (00247) (00250) (00251)
                   (00258) (00261) (00264) (00267) (00270) (00273) (00276) (00283) (00312) (00324)
                   (00351)
HUSPN:       046EC (00132) (00139)
HUSLP:       046E0 (00130) (00137)
HUSTHL:      047B2 (00129) (00361)
MSS:         00000 (00056) (00707) (00708) (00711) (00713) (00714) (00716) (00718) (00719) (00724)
                   (00750) (00751) (00752) (00753) (00754) (00755) (00756) (00759) (00763) (00768)
                   (00772) (00775) (00782) (00785) (00839) (00846) (00851) (00852) (00872) (00899)
                   (00901) (00902) (00926) (00930) (00932) (00934) (00935) (00936) (00959) (00976)
                   (00977) (00979) (00982) (01001) (01002) (01003) (01004) (01005) (01006) (01007)
MSKSLBYT:    0FF00 (00049) (00104) (00213) (00284) (00313) (00325)
MSKSRBYT:    000FF (00050) (00209)
PWR2S:       047BB (00108) (00244) (00368)
SHMS1:       04735 (00245) (00250)
SHMS2:       0473A (00249) (00254)
SHMSFFT:     04754 (00090) (00282)
SCRM:        0000F (00748) (00781)
SCRM0:       00010 (00158) (00750) (00760) (00764) (00769) (00773) (00776)
SCRM1S:      00011 (00164) (00751)
SCRM10S:     00021 (00180) (00772)
SCRM2S:      00012 (00159) (00752)
SCRM3S:      00013 (00168) (00753)
SCRM4:       0001A (00758) (00762)
SCRM4S:      00014 (00160) (00754)
SCRM5:       0001D (00762) (00767)
SCRM5S:      00015 (00165) (00755)
SCRM6:       00020 (00767) (00771)
SCRM6S:      00016 (00161) (00756)
SCRM7:       00023 (00183) (00771) (00775)
SCRM7S:      00018 (00171) (00759)
SCRM8S:      0001B (00174) (00763)
SCRM9S:      0001E (00177) (00768)
START:       04690 (00073) (00093)
SVTS:        00382 (00060) (00210)
SYSSFLGS:    1FFCF (00063)
TOFSCUR:     049C4 (00068) (01019)
TOFSPTR:     002BB (00048) (00066)
WS:          00002 (00052) (00082) (00087) (00113) (00114) (00115) (00116) (00117) (00120) (00148)
                   (00151) (00158) (00159) (00160) (00161) (00164) (00165) (00168) (00171) (00174)
                   (00177) (00180) (00183) (00190) (00191) (00194) (00200) (00201) (00204) (00211)
                   (00220) (00232) (00233) (00234) (00246) (00250) (00258) (00261) (00264) (00267)
                   (00270) (00273) (00276) (00291) (00296) (00300) (00317) (00329) (00337) (00338)
                   (00339) (00344) (00361) (00362) (00363) (00364) (00365)
```

```
PAGE    39:  FAST FOURIER TRANSFORM TRANSFORM ALGORITHSM - FF2R, FF2RB      MAY 7, 1980
             SYMBOL TABLE

  ZERO:       007BA (00062)

LINES WITH ERRORS:     0  (MAP VERSION R00101,10)   F=     0
```

T A B L E   O F   C O N T E N T S

```
                   *      APSDONE    AP PROCESS INTERRUPT HANDLER    MAY 28, 1980
                   *
                   *
                   *
                   *  THE AP DONE INTERRUPT ROUTINE HAS BEEN MODIFIED
                   *  FOR GTE SYLVANIA TO SPEED UP PROCESSING.
                   *  IN ADDITION, SPECIAL CODE HAS BEEN ADDED TO CONVERSE W/ TH
                   *  ATC DISPATCH PROGRAM "CSPUEK.TXT".
                   *
                   *    THE LIMITATIONS ARE DESCRIBED IN THE DOCUMENTATION.
                   *
                   *
         000002F6  *L = $02F6                       SET PC TO CSW FOR AP DONE INTERRUPT
                   *
002F6 0E82                   DATA APSDONE           SET CSW TO NEW START ADDRESS
                   *
```

```
          (00017) *  DEFINE NECESSARY SYMBOLS FROM SNAP-II EXECUTIVE
          (00018) *                                  RELEASE 3.05
          (00019) *
00001390  (00020)          ABORTS = $1390
00000245  (00021)          APSASSS = $245
0000024A  (00022)          APSCSL = $24A
00000006  (00023)          APSCSPU = $6
00000008  (00024)          APSECB = $8
0000000D  (00025)          APSGT = $D
00000244  (00026)          APSPAF = $244
00000010  (00027)          APSPBFF = 16
00000004  (00028)          APSSBMO = $4
0001FFC0  (00029)          APSSLA = $1FFC0
00000008  (00030)          APSSSIZE = $8
00000000  (00031)          APUSBMO = $0
0001FFCA  (00032)          APUSLA = $1FFCA
0001FFC8  (00033)          APUSPC = $1FFC8
00000003  (00034)          APUSSIZE = $3
00000002  (00035)          APUSSTRT = $2
          (00036) *
          (00037) *
00000011  (00038)          FLGSRT = $11
00000020  (00039)          FLGSSET = $20
          (00040) *
00000001  (00041)          HS = 1
00000502  (00042)         ISVTS=$502
0000057F  (00043)         ISAS125=ISVTS+D'125'
00000580  (00044)         ISAS126=ISVTS+D'126'
00000020  (00045)          IDEVS32 = $20
0000003F  (00046)          IDEVS62 = $3F
0000003F  (00047)          IDEVS63 = $3F
00000001  (00048)          ILVLS1 = $1
00000002  (00049)          ILVLS2 = $2
          (00050) *
00005000  (00051)          OFFSET = $5000
          (00052) *
00000E02  (00053)          SCDSENTRY = $E02
00001C12  (00054)          SETSSBB = $1C12
0001FFCF  (00055)          SYSSFLGS = $1FFCF
          (00056) *
00000002  (00057)          WS = $2
          (00058) *
          (00059) *
          (00060)          EJECT
```

DEFINE NECESSARY SYMBOLS FROM SNAP-II EXECUTIVE

```
                    (00061) *
          00000EB2  (00062) *L = $0EB2          SET PC TO OLD APSDONE + HS   (EVEN)
                    (00063) *
                    (00064) *  THIS MODULE IS ENTERED WHENEVER RA MAKES THE
                    (00065) *  TRANSITION FROM ON TO OFF OR THE EXECUTIVE HAS
                    (00066) *  GENERATED THE INTERRUPT BECAUSE THE AP IS IDLE AND
                    (00067) *  A TASK IS PENDING
                    (00068) *
                    (00069) *  THE MODULE RELEASES THE CURRENT ACTIVE TASK
                    (00070) *  AND ACTIVATES ANY PENDING TASK.
                    (00071) *
                    (00072) *  THE CONTENTS OF THE AP-PROCESSOR CONTROL BLOCK
                    (00073) *  ARE USED TO CONTROL THE FUNCTIONS OF THIS MODULE
                    (00074) *
                    (00075) *  THE MODULE ASSUMES THAT REGISTERS R1-R7 ARE
                    (00076) *  PRESERVED BY THE INTERRUPT.
                    (00077) *
                    (00078) *
00EB2 C060024A (00079) APSDONE    MOVMRL   R6,APSCSL          GET POINTERS TO SUPPORT LISTS
               (00080) **         ANDIR    R6, $FFFF          MASK ADDRESS FOR SIGN EXTENSION
               (00081) **         ANDIR    R7, $FFFF          IF ABOVE 16K HALFWORDS
00EB4 0260     (00082)            TEST     R6
00EB5 80100EC0 (00083)            JMP      APSDNE10,EQZ       JUMP IF NULL
               (00084) *
00EB7 0800     (00085)            EVEN
00EB8 E01C000B (00086)            MOVMR    R1, APSFCB(R6)     GET CURRENT AP-FCB POINTER
               (00087) **         DECM     APSASSS            IF SPECIAL SUPPORT SEMAPHORE NON-ZERO
               (00088) **         JMP      @APSCSPU(R6), GEZ  GOTO DESIGNATED MODULE
               (00089) *
               (00090) *
               (00091) * RETURN HERE IF JUMP WAS EXECUTED WHEN NO SUPPORT WAS REQUESTED
               (00092) *
               (00093) *
00EBA 12FC003E (00094) APSDONER   AINT     IDEVS63, ILVL$2    FLAG AP DONE TO WAITING PROGRAM
               (00095) **         MOVKR    R4,R1,,NOT. MSK$BTO GET POINTER TO FCB JUST PROCESSED
               (00096) **         MOVMR    R5, HS(R4)         AND FCB NUMBER WITH CONTROL BITS
               (00097) **         MOVRML   R4, APSLFCB        SAVE LAST FCB PROCESSED
               (00098) **         MOVMR    R3, APSPBFF(R6)    IF PERM. BOUND FUNCTION
               (00099) **         IORMR    R3, FLGSNOBT       OR BUFFER TESTING INHIBITED
               (00100) **         JMP      APSDNE05, NEZ      BYPASS BUFFER IN USE CLEANUP
               (00101) **
               (00102) **         MOVIR    R3, FCBSMNLB-1     ELSE RESET BUFFER IN-USE FLAGS
               (00103) **         MOVIR    R5,.NOT. MSKSCURB
               (00104) **         ADDIR    R4, WS(R3)         POINT TO LAST POSSIBLE LOGICAL BUFFER ID
```

DEFINE NECESSARY SYMBOLS FROM SNAP-II EXECUTIVE

```
                  (00105) **
                  (00106) ***22      MOVAR    R2,R4,MSKSLBYT
                  (00107) **         LRS      R2,7
                  (00108) **         DECR     R4,1
                  (00109) **         ANDRM    R5,BCTSAT(R2)
                  (00110) **         DJP      R3,#22
                  (00111) *
00FBC 2802        (00112) APSDNE05   SRBC     0, R1             IF FCB NOT IN FUNCTION LIST
00FBD 2002        (00113)            BOP      APSDNE10          BYPASS RELEASE OF THE FCB
                  (00114) *
00FBE 12000020    (00115)            AINT     IDEVS32, ILVLS1   RELEASE THE FCB
                  (00116) *
                  (00117) *  PROCESS PENDING TASK
                  (00118) *
00FC0 406F        (00119) APSDNE10   MOVRR    R6, R7            IF PENDING FCB NULL,
00FC1 0800        (00120)            EVEN
00FC2 80100FF0    (00121)            JMP      APSDNE20,EQZ      GO SET AP TO IDLE STATE
                  (00122) *
00FC4 0070        (00123)            CLR      R7                SET PENDING LIST TO NULL
00FC5 0800        (00124)            EVEN
00FC6 ECBC0000    (00125)            MOVAR    R3,@APUSBMO(R6)   NOW LOAD APU
                  (00126) **         CMPMR    R3, APSUBMO
                  (00127) **         JMP      APSDNE30,EQ       SET NEW CURRENT APU MODULE ORIGIN
                  (00128) **
                  (00129) **         MOVRM    R3,APSUBMO        UPDATE CURRENT APU MEMORY ORIGIN
                  (00130) **         MOVMR    R2,APUSSTRT(R6)   SET MODULE START IN AP
                  (00131) **         MOVRM    R2,APUSPC
00FC8 CC01FFC8    (00132)            MOVZM    APUSPC            ASSUME APU STARTS AT 0
00FCA F02C0003    (00133)            MOVMR    R2,APUSSIZE(R6)   GET MODULE SIZE
00FCC 2721        (00134)            DECR     R2, HS
                  (00135) **         SMBSL    BITSPT, SYSSFLGS  DETERMINE PROCESSOR TYPE
                  (00136) **         JMP      APSDNE40
                  (00137) **
                  (00138) **         DECR     R3,HS             MAP 100, 200
                  (00139) **         EVEN
                  (00140) **         LPROC    R3,R2,APUSLA
                  (00141) **         JMP      APSDNE30
                  (00142) *
00FCD 2732        (00143) APSDNE40   DECR     R3, WS            MAP 300
                  (00144)            EVEN
00FCE D635FFCA    (00145)            LPROCL   R3,R2,APUSLA
                  (00146) *
                  (00147) *R2        CCS      2
                  (00148) *R2        SCS      3
```

DEFINE NECESSARY SYMBOLS FROM SNAP-II EXECUTIVE

```
00FD0 ECHC0004 (00149) APSDNE30  MOVAR    R3, @APSSHMO(R6)
00FD2 2732     (00150)           DECR     R3,WS
00FD3 0600     (00151)           EVEN
               (00152) *R2       SUBIR    R3, OFFSET             SUBTRACT OFFSET ON BUS 2
               (00153) *
00FD4 E02C0008 (00154)           MOVAR    R2,APSSSIZE(R6)
00FD6 3C21     (00155)           ERS      R2, 1                  COUNT = # WORDS TO BE MOVED
00FD7 2721     (00156)           DECR     R2, HS
00FD8 D635FECO (00157)           LPROCL   R3,R2,APSSLA
               (00158) *
               (00159) *R2       CCS    3
               (00160) *R2       SCS    2
               (00161) *
               (00162) *  UPGRADE PENDING AP-FUNCTION TO CURRENT
               (00163) *
               (00164) **        MOVMRL   R4, APSG0(R6)          PICK UP G0, G1 FLAG STATES
00FDA E04C000D (00165)           MOVMR    R4, APSG1(R6)
00FDC E041EECE (00166)           MOVRM    R4, SYSSFLGS           SET OR CLEAR G1
               (00167) **        MOVRM    R5, SYSSFLGS           SET OR CLEAR G1
               (00168) **        MOVZM    APSASSS                SET SPECIAL SUPP. SEMAPHORE
               (00169) **        MOVMR    R4, APSSSS(R6)         SET SPECIAL SUPPORT SEMAPHORE
               (00170) **        MOVRM    R4, APSASSS
               (00171) **        MOVMRL   R3, APSSSCLR(R6)       SET SPECIAL SCALAR
               (00172) **        MOVRML   R3, APSCSSC
00FDE E863EECE (00173)           MOVLM    FLGSSET+FLGSRI, SYSSFLGS  START APS
               (00174) **
               (00175) **  CHECK FOR PERMENENTLY BOUND FUNCTION OR BUFFER CHECK INHIBIT
               (00176) **
               (00177) **        MOVMR    R3, APSPBEF(R6)        GET PERMANENTLY BOUND FUNCTION FLAG
               (00178) **        IORMR    R3, FLGSNOBT           COMBINE PBF FLAGS WITH BUFFER INHIBIT
               (00179) **        JMP      APSDNE15, NEZ          BYPASS BUFFER USAGE UPGRADE IF EITHER SET
               (00180) **
               (00181) **  BUFFER USAGE UPGRADE - PENDING TO CURRENT
               (00182) **
               (00183) **
               (00184) **        MOVMR    R1, APSFCB(R6)
               (00185) **        MOVIR    R3, FCBSMNLB-1
               (00186) **        MOVIR    R5,.NOT.MSKSPUBU
               (00187) **        MOVKR    R4, R1, .NOT. MSKSBTO
               (00188) **        ADDIR    R4,WS(R3)
               (00189) **
               (00190) **
               (00191) **   LOOP TO TRANSFER BUFFER USAGE BITS
               (00192) **
```

DEFINE NECESSARY SYMBOLS FROM S/AP-11 EXECUTIVE

```
                   **#21      MOVWR     R2,R4,MSKSLBYT
                   **         ERS       R2,7
                   **         EVEN
                   **         MOVIB     R1,MSKSPURO
                   **         ANDMR     R1,RCTSAT(R2)
                   **         ERS       R1,1
                   **         EVEN
                   **         ANDRM     R5,RCTSAT(R2)
                   **         IORRM     R1,RCTSAT(R2)
                   **         DECR      R4,1
                   **         EVEN
                   **         GAP       R3,#21
                   *
00FF0 R460024A     APSDNE15   MOVRML    R6, APSCSL          UPDATE SUPPORT LIST POINTERS
00FF2 90500001                MOVIR     R5, 1               FLAG AP BUSY
00FF3 F0500214                MOVRM     R5, APSPAF
00FF6 00900020                WAITC     IDEVS32, ILVLS1     WAIT TILL FCB RELEASE DONE
                   ****************************************************************
                   *  ADD INTERFACE CODE FOR "CSPUFK"
00FF8 FR020580             MOVLM HS,ISAS126                            SET "APDONE" SCALAR
00FFA F500057F             INCM ISAS125                                FCB CALLING CARD. =0 @ T
                   :                                                   OP OF MPWHL
                   ****************************************************************
00FFC 0F70                 RET                                         RETURN,BACK TO CSPUFK?
00FFD 0800                 EVEN
00FFF R0000FR2             JMP APSDONE                                 RESTART ON NEXT INTERRUP
                   :                                                   T
                   *
                   *
                   *  PATH FOR NULL PENDING FCB
                   *
                   *
00FF0 CC00024A     APSDNE20   MOVZM     APSCSL              SET CURRENT FCB NULL
00FF2 CC000244                MOVZM     APSPAF              SET PROCESSOR AVAILABLE
00FF4 00900020                WAITC     IDEVS32, ILVLS1     WAIT TILL FCB RELEASE DONE
00FF6 1200003F                AINT      IDEVS62, ILVLS1     TELL WAIT ROUTINE AP IS IDLE
                   ****************************************************************
                   *  ADD INTERFACE CODE FOR "CSPUFK"
00FF8 FR020580             MOVLM HS,ISAS126                            SET "APDONE" SCALAR
00FFA F500057F             INCM ISAS125                                FCB CALLING CARD. =0 @ T
                   :                                                   OP OF MPWHL
                   ****************************************************************
00FFC 0F70                 RET                                         RETURN,BACK TO CSPUFK?
00FFD 0800                 EVEN
```

```
AP PROCESS INTERRUPT HANDLER     MAY 28, 1980
   SYMBOLS FROM SNAP-II EXECUTIVE

            JMP APSDONE                               RESTART ON NEXT INTERRUP
    ;                                                 T
            END
```

DEFINE NECESSARY SYMBOLS FROM SNAP-II EXECUTIVE

```
ABORTS:     01390 (00020)
APSASSS:    00215 (00021)
APSCSL:     0024A (00022) (00079) (00206) (00225)
APSCSPD:    00006 (00023)
APSDNE05:   00EBC (00112)
APSDNE10:   00EC0 (00083) (00113) (00119)
APSDNE15:   00EE0 (00206)
APSDNE20:   00EEC (00121) (00225)
APSDNE30:   00ED0 (00149)
APSDNE40:   00ECD (00143)
APSDONE:    00E82 (00015) (00079) (00218) (00247)
APSDONER:   00E8A (00094)
APSECK:     00006 (00024) (00086)
APSG1:      0000D (00025) (00165)
APSPAE:     00244 (00026) (00208) (00226)
APSPBEE:    00010 (00027)
APSSBMD:    00004 (00028) (00149)
APSSLA:     1FFC0 (00029) (00157)
APSSSIZE:   00008 (00030) (00154)
APUSBMD:    00000 (00031) (00125)
APUSLA:     1FFCA (00032) (00145)
APUSPC:     1FFCB (00033) (00132)
APUSSIZE:   00003 (00034) (00133)
APUSSTRT:   00002 (00035)
FLGSET:     00011 (00038) (00173)
FLGSSET:    00020 (00039) (00173)
HS:         00001 (00041) (00134) (00156) (00212) (00231)
IDEVS32:    00020 (00045) (00115) (00209) (00227)
IDEVS62:    0003E (00046) (00228)
IDEVS64:    0003F (00047) (00094)
ILVLS1:     00001 (00048) (00115) (00209) (00227) (00228)
ILVLS2:     00002 (00049) (00094)
ISAS125:    0057F (00043) (00213) (00232)
ISAS126:    00580 (00044) (00212) (00231)
ISVTS:      00502 (00042) (00043) (00044)
OFFSET:     05000 (00051)
SCDSENTR:   00F02 (00053)
SETSSPB:    01C12 (00054)
SYSSFLGS:   1FFCF (00055) (00166) (00173)
WS:         00002 (00057) (00143) (00150)
```

LINES WITH ERRORS: 0 (MAP VERSION R00101.10)   E-   0

```
           * PROG, CSPUSP.TXT
           : CSPU SUPPORT PROGRAMS TO PERFORM I-O SYNCHRONIZATION,
           : SERIALIZATION,DESERIALIZATION, ERROR CODING AND ERROR DECODING
           :
           :                                      ORIGINATED:17-DEC-79
           :                                      UPDATED:    11-AUG-80
           : DEFINE GLOBAL SYMBOLS
                  OPAD LOAD,(1 .LS. 14)+(29 .LS. 8)+X'A6'
                  OPAD STORE,(1 .LS. 14)+(29 .LS. 8)+X'F1'
000008E8          XFERSOEG=$8E8
000021EC          CSPU$VOS=$21EC
00000018          IDEVS24=24
00000001          ILVLS1=1
00000405          CS&STD9=$405
00000004          CLKSG0=$4
00000006          CLKSG2=$6
00000007          CLKSG4=$7
00000024          SETSG0=$24
00000026          SETSG2=$26
00000027          SETSG3=$27
0001FFCE          SYSFLGS=$1FFCE
00000794          DMY$=$794
00000502          ISVTS=$0502
00000503          ISAS01=ISVTS+D'01'
00000566          ISAS100=ISVTS+D'100'
00000567          ISAS101=ISVTS+D'101'
00000568          ISAS102=ISVTS+D'102'
00000569          ISAS103=ISVTS+D'103'
0000056A          ISAS104=ISVTS+D'104'
0000056B          ISAS105=ISVTS+D'105'
0000056C          ISAS106=ISVTS+D'106'
0000056D          ISAS107=ISVTS+D'107'
0000056E          ISAS108=ISVTS+D'108'
0000056F          ISAS109=ISVTS+D'109'
00000570          ISAS110=ISVTS+D'110'
00000571          ISAS111=ISVTS+D'111'
00000572          ISAS112=ISVTS+D'112'
00000573          ISAS113=ISVTS+D'113'
00000574          RGO=ISVTS+D'114'
00000575          XGO=ISVTS+D'115'
00000576          RGO2=ISVTS+D'116'                    SYNC WITH APU FOR DESER.
00000577          SYNCS=ISVTS+D'117'
00000578          KSYN=ISVTS+D'118'
00000579          ERSYN=ISVTS+D'119'
```

```
00000578 (00045)        DLSYC=ISVIS+D'120'
0000057B (00046)        ISTEP=ISVIS+D'121'
0000057C (00047)        FLGAT=ISVIS+D'122'
00000581 (00048)        ISAS127=ISVIS+D'127'
00000003 (00049)        KS=3
00000001 (00050)        HS=1
00000000 (00051)        MS=0
00000000 (00052)        MSS=0
0000A000 (00053)        START=$A000
00000482 (00054)        SVIS=$0482
00000498 (00055)        SAS11=SVIS+2*D'11'
00000002 (00056)        WS=2
00000004 (00057)        ZS=4
         (00058) ;
         (00059) ;
         (00060) ;  DEFINITIONS OF BUFFER PARAMETERS
         (00061) ;
000000F6 (00062)        BLIO=246                          'SPEECH BUFFER LENGTH
00000100 (00063)        LIO=256
00000040 (00064)        LIOI=64
00000171 (00065)        LSFN=369                          'DATA BUFFER LENGTH
0000000D (00066)        LPARM=13                          'BASIS INFO BUFFER LENGT
         (00067) ;                                        H
0000003E (00068)        BLIO1=62
0000007C (00069)        BLIO12=124
0000003E (00070)        LSFN1=62
0000007C (00071)        LSFN12=124
0000003D (00072)        LSFN2=61
0000007A (00073)        LSFN22=122
         (00074) ;
         (00075) ;  DEFINITIONS OF I-O BUFFER FLAGS
         (00076) ;
00000566 (00077)        RLAS=ISAS100                      'READY TO ANALYZE:0=YES
         (00078) ;                                        1=NO
00000567 (00079)        AFLGS=ISAS101                     'OUTPUT XMIT DATA BUFFER
         (00080) ;                                        :
00000568 (00081)        SYNS=ISAS102                      'READY TO SYNTHESIZE:
00000569 (00082)        SFLGS=ISAS103                     'INPUT RCVR DATA BUFFER:
0000056A (00083)        OUTS=ISAS104                      'READY TO OUTPUT SPEECH:
0000056B (00084)        OFLGS=ISAS105                     'OUTPUT SPCH BUFFER:
0000056C (00085)        INPS=ISAS106                      'READY TO INPUT SPCH:
0000056D (00086)        IFLGS=ISAS107                     'INPUT SPCH BUFFER:
00000581 (00087)        FCVOFF=ISAS127                    '*** FOR TIMER PROGRAM O
         (00088) ;                                        NLY ***
```

```
                     (00089) ;
                     (00090) ;
                     (00091) ;  EXTRA I-O FLAGS (PRIMARILY TO INDICATE ERRORS)
                     (00092) ;
          0000056E   (00093)          ELATAS=ISAS108
          0000056F   (00094)          XLATAS=ISAS109
          00000570   (00095)          INFOLL=ISAS110
          00000571   (00096)          OUTFUL=ISAS111
          00000572   (00097)          KOUNTS=ISAS112
          00000574   (00098)          INITS=ISAS113
          00000580   (00099)          APPNELS=S502+126                    ISVTS+126=IS126
                     (00100) ;
                     (00101) ;
                     (00102) *
                     (00103) *
                     (00104) ;  INCLUDE INTERRUPT TRANSFER VECTOR
                     (00105) *
          000000C2   (00106)          *L=SC2
00002 871009E1A      (00107)          IPTRPT R1,CS*SD24
                     (00108) ;  ENABLE
          00000D76   (00109)          *L=S0D76
00D76 12900018       (00110)          EINT IDEVS24,ILVLS1
                     (00111) ;PATCH SCHEDULE TABLE D24 INSTEAD OF 2ND GO, AND END TABLE
          0000037A   (00112)          *L=S37A
0037A 0018           (00113)          DATA 24
                     (00114) ;CHANGE PRIORITIES OF IO SCROLLS
          0000036A   (00115)          *L=S36A
0036A 0018           (00116)          DATA S18,S16,S17
0036B 0016
0036C 0017
                     (00117) ;PATCH "SCD" TO INTERRUPT TO CSPD
          00000DEE   (00118) SCDS19=S0DEE
          00000E50   (00119)          *L=S0E50
00E50 80001D50       (00120)          JMP S1D50
          00001D50   (00121)          *L=S1D50
01D50 12000018       (00122)          KIST IDEVS24,ILVLS1
01D52 00000018       (00123)          KATIC IDEVS24,ILVLS1
01D54 80000DEE       (00124)          JMP SCDS19
                     (00125)          EJECT
```

```
                    (00126) *
                    (00127) *>>>>>>>>>>>>>>>>>>>>>>>>>>>> C S P U <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                    (00128) *
                    (00129)           ROS 2
          00000E2A  (00130)           #L=3370
00E2A 0000          (00131) MIN1S     DATA D'0'
          00000E20  (00132)           #L=3616
00E20 0000          (00133) MIN2S     DATA D'0'
          0000100C  (00133)           #L=4100
0100C 0000          (00135) NOUT1S    DATA D'0'
          00001102  (00136)           #L=4354
01102 0000          (00137) NOUT2S    DATA D'0'
          000011FE  (00138)           #L=4600
011FE 0000          (00139) RECV1S    DATA D'0'
          00001369  (00140)           #L=4969
01369 0000          (00131) RECV2S    DATA D'0'
          0000140C  (00142)           #L=5340
0140C 0000          (00133) SEN1S     DATA D'0'
          0000164E  (00134)           #L=5710
0164E 0000          (00135) SEN2S     DATA D'0'
                    (00146) ;
                    (00147) ;
                    (00148) ;
                    (00149) ;
                    (00150) ;
                    (00151)           ROS 1
          00008A00  (00152)           #L=35328
                    (00153) QPRS
08A00 0000          (00154) QIPARS    DATA 8D'0'
 ...
08A08 0000          (00155) QIVAR     DATA D'0'
08A09 0000          (00156) QTUCS     DATA D'0'
08A0A 0000          (00157) QTMS      DATA D'0'
08A0B 0000          (00158) QIVS      DATA D'0'
08A0C 0000          (00159) QICS      DATA D'0'
          00008A0E  (00160)           #L=35342
08A0E 0000          (00161) QTPCTS    DATA D'0'
          00008A0E  (00162)           #L=35598
08B0E 0000          (00163) TBLLS     DATA D'0'
          00008C0E  (00164)           #L=35854
08C0E 0000          (00165) SENS      DATA D'0'
          00008D80  (00166)           #L=36224
08D80 0000          (00167) TOPNS     DATA D'0'
          00008E80  (00168)           #L=36480
```

```
08E80 0000        (00169) BE1S     DATA D'0'
      00008EE1    (00170)          #L=36849
08EE1 0000        (00171) BE2S     DATA D'0'
      00009162    (00172)          #L=37218
09162 0000        (00173) BE3S     DATA D'0'
      00009204    (00174)          #L=37507
09204 0000        (00175) ZROS     DATA D'0'
                  (00176)
      00009444    (00177)          #L=37956
09444 0000        (00178) OUTBS    DATA D'0'
      00009514    (00179)          #L=38212
09514 0000        (00180) RECVS    DATA D'0'
      00009666    (00181)          #L=38582
09666 0000        (00182) RQPRS    DATA D'0'
      000096C4    (00183)          #L=38596
096C4 0000        (00184) RQTDCIS  DATA D'0'
      000097C4    (00185)          #L=38852
097C4 0000        (00186) SYNB1S   DATA D'0'
      000097C4    (00187)          RSSSS=SYNB1S
      00009935    (00188)          #L=39221
09935 0000        (00189) SYNB2S   DATA D'0'
      00009935    (00190)          RSSPE=SYNB2S
      00009AA6    (00191)          #L=39590
09AA6 0000        (00192) RBBITS   DATA D'0'
      00009C40    (00193)          #L=40000
                  (00194)          EVEN
09C40 0000A088    (00195) INDX1S   ADDR BIT0S,BIT5S,BIT4S,BIT4S,BIT1S,BIT1S
09C42 0000A074
09C44 0000A078
09C46 0000A074
09C48 0000A084
09C4A 0000A084
09C4C 0000A080    (00196)          ADDR BIT2S,BIT2S,BIT3S,BIT3S,BIT4S,BIT4S
09C4E 0000A080
09C50 0000A07C
09C52 0000A07C
09C54 0000A078
09C56 0000A078
                  (00197)          EVEN
09C58 0000A242    (00198) INDX2S   ADDR DBIT0S,DBIT1S,DBIT2S,DBIT3S,DBIT4S
09C5A 0000A1D0
09C5C 0000A176
09C5E 0000A110
09C60 0000A0B2
```

```
                            (00199)          EVEN
09C62 0000A96A (00200) INDX4S   ADDR FBIT0S,FBIT5S,FBIT4S,FBIT4S,FBIT1S,FBIT1S
09C64 0000A92C
09C66 0000A942
09C68 0000A942
09C6A 0000A944
09C6C 0000A944
09C6E 0000A93E (00201)          ADDR FBIT2S,FBIT2S,FBIT3S,FBIT3S,FBIT4S,FBIT4S
09C70 0000A93E
09C72 0000A93B
09C74 0000A93B
09C76 0000A932
09C78 0000A932
                            (00202)          EVEN
09C7A 0000AA44 (00203) INDX5S   ADDR GBIT0S,GBIT1S,GBIT2S,GBIT3S,GBIT4S
09C7C 0000AADF
09C7E 0000AA78
09C80 0000AA12
09C82 0000A 60
                            (00204)          EVEN
09C83 0000     (00205) FRSTF    DATA 0                                    SET TO INDICATE FIRST RC
               (00206) ;                                                  VR FRAME AFTER SYNC
09C85 0060     (00207) POST2S   DATA D'109'
09C86 00AC     (00208) POST3S   DATA D'172'
09C87 8CEA     (00209) POST3S1  DATA SEQS+172
09C88 95E0     (00210) POST3S2  DATA RECVS+172
09C89 0170     (00211) POST4S   DATA LSER-1
09C8A 0000     (00212) ZEROS    DATA D'0'
09C8B 00FF     (00213) FRMLNGS  DATA  LTH-1
09C8C 0016     (00214) PARMSM2  DATA LPARM+LPARM-4
09C8D 0000     (00215) MASKS    DATA D'0'
09C8E 0012     (00216) FICTFLS  DATA D'18'
09C8F 002C     (00217) FOREOFS  DATA D'44'
09C90 0001     (00218) ONES     DATA D'1'
09C91 0000     (00219) ERRS     DATA D'0'
09C92 0000     (00220) SAVES    DATA D'0'
09C93 0000     (00221) Z21S     DATA D'0'
09C94 0020     (00222) THRSHDS  DATA D'15'
09C95 0005     (00223) NARS     DATA 5,5,3,1,1,1,2,2,5,5,6,1,2
09C96 0005
09C97 0003
09C98 0001
09C99 0001
09C9A 0003
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09C9B 0002
09C9C 0002
09C9D 0005
09C9E 0005
09C9F 0006
09CA0 0001
09CA1 0002
09CA2 7059     (00224) IBENCS  DATA D'28761',D'7'          ENCODER TABLE FOR A (63,
09CA3 0007
               (00225) :                                   1ST BCH CODE
09CA4 10EA     (00226)         DATA D'4330',D'1'           IN REVERSE ORDER
09CA5 0001
09CA6 21D4     (00227)         DATA D'8660',D'2'
09CA7 0002
09CA8 43A8     (00228)         DATA D'17320',D'4'
09CA9 0004
09CAA 7708     (00229)         DATA D'30472',D'7'
09CAB 0007
09CAC 1E48     (00230)         DATA D'7752',D'1'
09CAD 0001
09CAE 3C90     (00231)         DATA D'15504',D'2'
09CAF 0002
09CB0 7920     (00232)         DATA D'31008',D'4'
09CB1 0001
09CB2 0218     (00233)         DATA D'536',D'7'
09CB3 0007
09CB4 0431     (00234)         DATA D'1073',D'6'
09CB5 0006
09CB6 0863     (00235)         DATA D'2147',D'4'
09CB7 0001
09CB8 10C7     (00236)         DATA D'4295',D'0'
09CB9 0000
09CBA 218E     (00237)         DATA D'8590',D'0'
09CBB 0000
09CBC 431C     (00238)         DATA D'17180',D'0'
09CBD 0000
09CBE 7661     (00239)         DATA D'30305',D'7'
09CBF 0007
09CC0 1C9A     (00240)         DATA D'7322',D'1'
09CC1 0001
09CC2 3934     (00241)         DATA D'14644',D'2'
09CC3 0002
09CC4 7268     (00242)         DATA D'29288',D'4'
09CC5 0004
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09CC6 1488      (00243)      DATA D'5256',D'7'
09CC7 0007
09CC8 2911      (00244)      DATA D'10513',D'6'
09CC9 0006
09CCA 5223      (00245)      DATA D'21027',D'4'
09CCB 0004
09CCC 541B      (00246)      DATA D'21531',D'7'
09CCD 0007
09CCE 5864      (00247)      DATA D'22628',D'1'
09CCF 0001
09CD0 4091      (00248)      DATA D'16529',D'5'
09CD1 0005
09CD2 717A      (00249)      DATA D'29050',D'5'
09CD3 0005
09CD4 12AC      (00250)      DATA D'4780',D'5'
09CD5 0005
09CD6 2559      (00251)      DATA D'9561',D'2'
09CD7 0002
09CD8 4AB2      (00252)      DATA D'19122',D'4'
09CD9 0004
09CDA 653C      (00253)      DATA D'25916',D'7'
09CDB 0007
09CDC 3A20      (00254)      DATA D'14880',D'1'
09CDD 0001
09CDE 7440      (00255)      DATA D'29760',D'2'
09CDF 0002
09CE0 18D9      (00256)      DATA D'6361',D'3'
09CE1 0003
09CE2 31B2      (00257)      DATA D'12722',D'6'
09CE3 0006
09CE4 6365      (00258)      DATA D'25445',D'4'
09CE5 0004
09CE6 3692      (00259)      DATA D'13970',D'7'
09CE7 0007
09CE8 6D25      (00260)      DATA D'27941',D'6'
09CE9 0006
09CEA 2A12      (00261)      DATA D'10770',D'3'
09CEB 0003
09CEC 5424      (00262)      DATA D'21540',D'6'
09CED 0006
09CEE 5810      (00263)      DATA D'22544',D'3'
09CEF 0003
09CF0 4079      (00264)      DATA D'16505',D'1'
09CF1 0001
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09CF2 70AB      (00265)          DATA D'28843',D'5'
09CF3 0005
09CF4 110E      (00266)          DATA D'4366',D'5'
09CF5 0005
09CF6 221D      (00267)          DATA D'8733',D'2'
09CF7 0002
09CF8 443A      (00268)          DATA D'17466',D'4'
09CF9 0004
09CFA 782C      (00269)          DATA D'30764',D'7'                        RESIDUE DUE TO FIRST INF
09CFB 0007
                (00270) ;                                                  ORMATION BIT
09CFC 0001      (00271) IMPCWS   DATA D'1',D'1',D'1'                       POWER SUM TABLE IN REVER
09CFD 0001
09CFE 0001
                (00272) ;                                                  SE ORDER
09CFF 0002      (00273)          DATA D'2',D'8',D'32'
09D00 0008
09D01 0020
09D02 0004      (00274)          DATA D'4',D'3',D'48'
09D03 0003
09D04 0030
09D05 0008      (00275)          DATA D'8',D'24',D'40'
09D06 0018
09D07 0028
09D08 0010      (00276)          DATA D'16',D'5',D'60'
09D09 0005
09D0A 003C
09D0B 0020      (00277)          DATA D'32',D'40',D'34'
09D0C 0028
09D0D 0022
09D0E 0003      (00278)          DATA D'3',D'15',D'51'
09D0F 000F
09D10 0033
09D11 0006      (00279)          DATA D'6',D'59',D'11'
09D12 003B
09D13 000B
09D14 000C      (00280)          DATA D'12',D'17',D'47'
09D15 0011
09D16 002F
09D17 0018      (00281)          DATA D'24',D'14',D'25'
09D18 000E
09D19 0019
09D1A 0030      (00282)          DATA D'48',D'51',D'52'
09D1B 0033
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0901C 0041
0901D 0023      (00283)          DATA D'35',D'18',D'46'
0901E 0012
0901F 002E
09020 0005      (00284)          DATA D'5',D'22',D'57'
09021 0016
09022 0039
09023 000A      (00285)          DATA D'10',D'54',D'4'
09024 0036
09025 0004
09026 0014      (00286)          DATA D'20',D'58',D'6'
09027 003A
09028 0006
09029 0028      (00287)          DATA D'40',D'25',D'5'
0902A 0019
0902B 0005
0902C 0013      (00288)          DATA D'19',D'13',D'38'
0902D 000D
0902E 0026
0902F 0026      (00289)          DATA D'38',D'43',D'53'
09030 002B
09031 0035
09032 000F      (00290)          DATA D'15',D'23',D'14'
09033 0017
09034 000E
09035 001E      (00291)          DATA D'30',D'62',D'9'
09036 003E
09037 0009
09038 003C      (00292)          DATA D'60',D'57',D'44'
09039 0039
0903A 002C
0903B 003B      (00293)          DATA D'59',D'1',D'58'
0903C 0001
0903D 003A
0903E 0035      (00294)          DATA D'53',D'8',D'39'
0903F 0008
09040 0027
09041 0029      (00295)          DATA D'41',D'3',D'21'
09042 0003
09043 0015
09044 0011      (00296)          DATA D'17',D'22',D'62'
09045 0016
09046 003E
09047 0022      (00297)          DATA D'34',D'5',D'33'
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09D48 0005
09D49 0021
09D4A 0007     (00298)     DATA D'7',D'40',D'16'
09D4B 0028
09D4C 0010
09D4D 000E     (00299)     DATA D'14',D'15',D'24'
09D4E 000F
09D4F 0018
09D50 001C     (00300)     DATA D'28',D'59',D'20'
09D51 003B
09D52 0014
09D53 0038     (00301)     DATA D'56',D'17',D'30'
09D54 0011
09D55 001E
09D56 0033     (00302)     DATA D'51',D'14',D'17'
09D57 000E
09D58 0011
09D59 0025     (00304)     DATA D'37',D'51',D'56'
09D5A 0033
09D5B 0038
09D5C 0009     (00303)     DATA D'9',D'18',D'36'
09D5D 0012
09D5E 0024
09D5F 0012     (00305)     DATA D'18',D'22',D'54'
09D60 0016
09D61 0036
09D62 0024     (00306)     DATA D'36',D'54',D'45'
09D63 0036
09D64 002D
09D65 000B     (00307)     DATA D'11',D'58',D'26'
09D66 003A
09D67 001A
09D68 0016     (00308)     DATA D'22',D'25',D'23'
09D69 0019
09D6A 0017
09D6B 002C     (00309)     DATA D'44',D'13',D'61'
09D6C 000D
09D6D 003D
09D6E 001B     (00310)     DATA D'27',D'43',D'2'
09D6F 002B
09D70 0002
09D71 0036     (00311)     DATA D'54',D'23',D'3'
09D72 0017
09D73 0003
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09D74 002F        (00312)        DATA D'47',D'62',D'45'
09D75 003E
09D76 002D
09D77 001D        (00313)        DATA D'29',D'57',D'19'
09D78 0039
09D79 0013
09D7A 003A        (00314)        DATA D'58',D'1',D'59'
09D7B 0001
09D7C 003B
09D7D 0037        (00315)        DATA D'55',D'8',D'7'
09D7E 0008
09D7F 0007
09D80 002D        (00316)        DATA D'45',D'3',D'37'
09D81 0003
09D82 0025
09D83 0019        (00317)        DATA D'25',D'24',D'22'
09D84 0018
09D85 0016
09D86 0032        (00318)        DATA D'50',D'5',D'29'
09D87 0005
09D88 001D
09D89 0027        (00319)        DATA D'39',D'40',D'50'
09D8A 0028
09D8B 0032
09D8C 000D        (00320)        DATA D'13',D'15',D'43'
09D8D 000F
09D8E 002B
09D8F 001A        (00321)        DATA D'26',D'59',D'31'
09D90 003B
09D91 001F
09D92 0034        (00322)        DATA D'52',D'17',D'49'
09D93 0011
09D94 0031
09D95 002B        (00323)        DATA D'43',D'14',D'8'
09D96 000E
09D97 0008
09D98 0015        (00324)        DATA D'21',D'51',D'12'
09D99 0033
09D9A 000C
09D9B 002A        (00325)        DATA D'42',D'18',D'10'
09D9C 0012
09D9D 000A
09D9E 0017        (00326)        DATA D'23',D'22',D'15'
09D9F 0016
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AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

UNCLASSIFIED NL

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AD
A091663

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09DA0 000F
09DA1 002E     (00327)           DATA D'46',D'54',D'41'
09DA2 0036
09DA3 0029
09DA4 001F     (00328)           DATA D'31',D'58',D'28'
09DA5 003A
09DA6 001C
09DA7 003E     (00329)           DATA D'62',D'25',D'18'
09DA8 0019
09DA9 0012
09DAA 003F     (00330)           DATA D'63',D'13',D'27'
09DAB 000D
09DAC 001B
09DAD 003D     (00331)           DATA D'61',D'43',D'55'
09DAE 002B
09DAF 0037
09DB0 0039     (00332)           DATA D'57',D'23',D'13'
09DB1 0017
09DB2 000D
09DB3 0031     (00333)           DATA D'49',D'62',D'42'
09DB4 003E
09DB5 002A
09DB6 0021     (00334)           DATA D'33',D'57',D'63'        POWER SUMS S1,S3,S5 DUE
09DB7 0039
09DB8 003F
               (00335) ;                                       TO FIRST INFORMATION BIT
09DB9 0001     (00336) TAPRCS    DATA D'1'                     POWER TO RESIDUE CONVERS
               (00337) ;                                       ION TABLE
09DBA 0002     (00338)           DATA D'2'                     FOR A (63,45) BCH CODE
09DBB 0004     (00339)           DATA D'4'
09DBC 0008     (00340)           DATA D'8'
09DBD 0010     (00341)           DATA D'16'
09DBE 0020     (00342)           DATA D'32'
09DBF 0003     (00343)           DATA D'3'
09DC0 0006     (00344)           DATA D'6'
09DC1 000C     (00345)           DATA D'12'
09DC2 0018     (00346)           DATA D'24'
09DC3 0030     (00347)           DATA D'48'
09DC4 0023     (00348)           DATA D'35'
09DC5 0005     (00349)           DATA D'5'
09DC6 000A     (00350)           DATA D'10'
09DC7 0014     (00351)           DATA D'20'
09DC8 0028     (00352)           DATA D'40'
09DC9 0013     (00353)           DATA D'19'
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09DCA 0026      (00354)      DATA D'38'
09DCB 000F      (00355)      DATA D'15'
09DCC 001E      (00356)      DATA D'30'
09DCD 003C      (00357)      DATA D'60'
09DCE 003B      (00358)      DATA D'59'
09DCF 0035      (00359)      DATA D'53'
09DD0 0029      (00360)      DATA D'41'
09DD1 0011      (00361)      DATA D'17'
09DD2 0022      (00362)      DATA D'34'
09DD3 0007      (00363)      DATA D'7'
09DD4 000E      (00364)      DATA D'14'
09DD5 001C      (00365)      DATA D'28'
09DD6 0038      (00366)      DATA D'56'
09DD7 0033      (00367)      DATA D'51'
09DD8 0025      (00368)      DATA D'37'
09DD9 0009      (00369)      DATA D'9'
09DDA 0012      (00370)      DATA D'18'
09DDB 0024      (00371)      DATA D'36'
09DDC 000B      (00372)      DATA D'11'
09DDD 0016      (00373)      DATA D'22'
09DDE 002C      (00374)      DATA D'44'
09DDF 001B      (00375)      DATA D'27'
09DE0 0036      (00376)      DATA D'54'
09DE1 002F      (00377)      DATA D'47'
09DE2 001D      (00378)      DATA D'29'
09DE3 003A      (00379)      DATA D'58'
09DE4 0037      (00380)      DATA D'55'
09DE5 002D      (00381)      DATA D'45'
09DE6 0019      (00382)      DATA D'25'
09DE7 0032      (00383)      DATA D'50'
09DE8 0027      (00384)      DATA D'39'
09DE9 000D      (00385)      DATA D'13'
09DEA 001A      (00386)      DATA D'26'
09DEB 0034      (00387)      DATA D'52'
09DEC 002B      (00388)      DATA D'43'
09DED 0015      (00389)      DATA D'21'
09DEE 002A      (00390)      DATA D'42'
09DEF 0017      (00391)      DATA D'23'
09DF0 002E      (00392)      DATA D'46'
09DF1 001F      (00393)      DATA D'31'
09DF2 003E      (00394)      DATA D'62'
09DF3 003F      (00395)      DATA D'63'
09DF4 003D      (00396)      DATA D'61'
09DF5 0039      (00397)      DATA D'57'
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09DE6 0031     (00398)          DATA D'49'
09DE7 0021     (00399)          DATA D'33'
09DE8 0000     (00400) TBRPCS   DATA D'0'          DUMMY DATA MEMORY
09DE9 0000     (00401)          DATA D'0'          RESIDUE TO POWER CONVERS
               (00402) ;                           ION TABLE
09DEA 0001     (00403)          DATA D'1'          FOR A (63,45) BCH CODE
09DEB 0006     (00404)          DATA D'6'
09DEC 0002     (00405)          DATA D'2'
09DED 000C     (00406)          DATA D'12'
09DEE 0007     (00407)          DATA D'7'
09DEF 001A     (00408)          DATA D'26'
09E00 0003     (00409)          DATA D'3'
09E01 0020     (00410)          DATA D'32'
09E02 000D     (00411)          DATA D'13'
09E03 0023     (00412)          DATA D'35'
09E04 0008     (00413)          DATA D'8'
09E05 0030     (00414)          DATA D'48'
09E06 001B     (00415)          DATA D'27'
09E07 0012     (00416)          DATA D'18'
09E08 0004     (00417)          DATA D'4'
09E09 0018     (00418)          DATA D'24'
09E0A 0021     (00419)          DATA D'33'
09E0B 0010     (00420)          DATA D'16'
09E0C 000E     (00421)          DATA D'14'
09E0D 0034     (00422)          DATA D'52'
09E0E 0024     (00423)          DATA D'36'
09E0F 0036     (00424)          DATA D'54'
09E10 0009     (00425)          DATA D'9'
09E11 002D     (00426)          DATA D'45'
09E12 0031     (00427)          DATA D'49'
09E13 0026     (00428)          DATA D'38'
09E14 001C     (00429)          DATA D'28'
09E15 0029     (00430)          DATA D'41'
09E16 0013     (00431)          DATA D'19'
09E17 0038     (00432)          DATA D'56'
09E18 0005     (00433)          DATA D'5'
09E19 003E     (00434)          DATA D'62'
09E1A 0019     (00435)          DATA D'25'
09E1B 000B     (00436)          DATA D'11'
09E1C 0022     (00437)          DATA D'34'
09E1D 001F     (00438)          DATA D'31'
09E1E 0011     (00439)          DATA D'17'
09E1F 002F     (00440)          DATA D'47'
09E20 000F     (00441)          DATA D'15'
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09F21 0017     (00442)          DATA D'23'
09F22 0035     (00443)          DATA D'53'
09F23 0033     (00444)          DATA D'51'
09F24 0025     (00445)          DATA D'37'
09F25 002C     (00446)          DATA D'44'
09F26 0037     (00447)          DATA D'55'
09F27 0028     (00448)          DATA D'40'
09F28 000A     (00449)          DATA D'10'
09F29 003D     (00450)          DATA D'61'
09F2A 002E     (00451)          DATA D'46'
09F2B 001E     (00452)          DATA D'30'
09F2C 0032     (00453)          DATA D'50'
09F2D 0016     (00454)          DATA D'22'
09F2E 0027     (00455)          DATA D'39'
09F2F 002B     (00456)          DATA D'43'
09F30 001D     (00457)          DATA D'29'
09F31 003C     (00458)          DATA D'60'
09F32 002A     (00459)          DATA D'42'
09F33 0015     (00460)          DATA D'21'
09F34 0014     (00461)          DATA D'20'
09F35 003B     (00462)          DATA D'59'
09F36 0039     (00463)          DATA D'57'
09F37 003A     (00464)          DATA D'58'
09F38 0000     (00465) TBAL1S   DATA D'0'          MULT. TABLE OF ALPA FOR
               (00466) ;                           A (63,45)BCH CODE
09F39 0002     (00467)          DATA D'2'
09F3A 0004     (00468)          DATA D'4'
09F3B 0006     (00469)          DATA D'6'
09F3C 0008     (00470)          DATA D'8'
09F3D 000A     (00471)          DATA D'10'
09F3E 000C     (00472)          DATA D'12'
09F3F 000E     (00473)          DATA D'14'
09F40 0010     (00474)          DATA D'16'
09F41 0012     (00475)          DATA D'18'
09F42 0014     (00476)          DATA D'20'
09F43 0016     (00477)          DATA D'22'
09F44 0018     (00478)          DATA D'24'
09F45 001A     (00479)          DATA D'26'
09F46 001C     (00480)          DATA D'28'
09F47 001E     (00481)          DATA D'30'
09F48 0020     (00482)          DATA D'32'
09F49 0022     (00483)          DATA D'34'
09F4A 0024     (00484)          DATA D'36'
09F4B 0026     (00485)          DATA D'38'
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09F4C 0028        (00486)           DATA D'40'
09F4D 002A        (00487)           DATA D'42'
09F4E 002C        (00488)           DATA D'44'
09F4F 002E        (00489)           DATA D'46'
09F50 0030        (00490)           DATA D'48'
09F51 0032        (00491)           DATA D'50'
09F52 0034        (00492)           DATA D'52'
09F53 0036        (00493)           DATA D'54'
09F54 0038        (00494)           DATA D'56'
09F55 003A        (00495)           DATA D'58'
09F56 003C        (00496)           DATA D'60'
09F57 003E        (00497)           DATA D'62'
09F58 0003        (00498)           DATA D'3'
09F59 0001        (00499)           DATA D'1'
09F5A 0007        (00500)           DATA D'7'
09F5B 0005        (00501)           DATA D'5'
09F5C 000B        (00502)           DATA D'11'
09F5D 0009        (00503)           DATA D'9'
09F5E 000F        (00504)           DATA D'15'
09F5F 000D        (00505)           DATA D'13'
09F60 0013        (00506)           DATA D'19'
09F61 0011        (00507)           DATA D'17'
09F62 0017        (00508)           DATA D'23'
09F63 0015        (00509)           DATA D'21'
09F64 001B        (00510)           DATA D'27'
09F65 0019        (00511)           DATA D'25'
09F66 001F        (00512)           DATA D'31'
09F67 001D        (00513)           DATA D'29'
09F68 0023        (00514)           DATA D'35'
09F69 0021        (00515)           DATA D'33'
09F6A 0027        (00516)           DATA D'39'
09F6B 0025        (00517)           DATA D'37'
09F6C 002B        (00518)           DATA D'43'
09F6D 0029        (00519)           DATA D'41'
09F6E 002F        (00520)           DATA D'47'
09F6F 002D        (00521)           DATA D'45'
09F70 0033        (00522)           DATA D'51'
09F71 0031        (00523)           DATA D'49'
09F72 0037        (00524)           DATA D'55'
09F73 0035        (00525)           DATA D'53'
09F74 003B        (00526)           DATA D'59'
09F75 0039        (00527)           DATA D'57'
09F76 003F        (00528)           DATA D'63'
09F77 003D        (00529)           DATA D'61'
```

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```
09F78 0000    (00530) TBAL2S   DATA D'0'      MULT. TABLE OF ALPA**2
09F79 0004    (00531)          DATA D'4'
09F7A 0008    (00532)          DATA D'8'
09F7B 000C    (00533)          DATA D'12'
09F7C 0010    (00534)          DATA D'16'
09F7D 0014    (00535)          DATA D'20'
09F7E 0018    (00536)          DATA D'24'
09F7F 001C    (00537)          DATA D'28'
09F80 0020    (00538)          DATA D'32'
09F81 0024    (00539)          DATA D'36'
09F82 0028    (00540)          DATA D'40'
09F83 002C    (00541)          DATA D'44'
09F84 0030    (00542)          DATA D'48'
09F85 0034    (00543)          DATA D'52'
09F86 0038    (00544)          DATA D'56'
09F87 003C    (00545)          DATA D'60'
09F88 0003    (00546)          DATA D'3'
09F89 0007    (00547)          DATA D'7'
09F8A 000B    (00548)          DATA D'11'
09F8B 000F    (00549)          DATA D'15'
09F8C 0013    (00550)          DATA D'19'
09F8D 0017    (00551)          DATA D'23'
09F8E 001B    (00552)          DATA D'27'
09F8F 001F    (00553)          DATA D'31'
09F90 0023    (00554)          DATA D'35'
09F91 0027    (00555)          DATA D'39'
09F92 002B    (00556)          DATA D'43'
09F93 002F    (00557)          DATA D'47'
09F94 0033    (00558)          DATA D'51'
09F95 0037    (00559)          DATA D'55'
09F96 003B    (00560)          DATA D'59'
09F97 003F    (00561)          DATA D'63'
09F98 0006    (00562)          DATA D'6'
09F99 0002    (00563)          DATA D'2'
09F9A 000E    (00564)          DATA D'14'
09F9B 000A    (00565)          DATA D'10'
09F9C 0016    (00566)          DATA D'22'
09F9D 0012    (00567)          DATA D'18'
09F9E 001E    (00568)          DATA D'30'
09F9F 001A    (00569)          DATA D'26'
09FA0 0026    (00570)          DATA D'38'
09FA1 0022    (00571)          DATA D'34'
09FA2 002E    (00572)          DATA D'46'
09FA3 002A    (00573)          DATA D'42'
```

```
09FA4 0036     (00574)          DATA D'54'
09FA5 0032     (00575)          DATA D'50'
09FA6 003E     (00576)          DATA D'62'
09FA7 003A     (00577)          DATA D'58'
09FA8 0005     (00578)          DATA D'5'
09FA9 0001     (00579)          DATA D'1'
09FAA 000D     (00580)          DATA D'13'
09FAB 0009     (00581)          DATA D'9'
09FAC 0015     (00582)          DATA D'21'
09FAD 0011     (00583)          DATA D'17'
09FAE 001D     (00584)          DATA D'29'
09FAF 0019     (00585)          DATA D'25'
09FB0 0025     (00586)          DATA D'37'
09FB1 0021     (00587)          DATA D'33'
09FB2 002D     (00588)          DATA D'45'
09FB3 0029     (00589)          DATA D'41'
09FB4 0035     (00590)          DATA D'53'
09FB5 0031     (00591)          DATA D'49'
09FB6 003D     (00592)          DATA D'61'
09FB7 0039     (00593)          DATA D'57'
09FB8 0000     (00594) TBAL3S   DATA D'0'                              MULT. TABLE OF ALPA**3
09FB9 0008     (00595)          DATA D'8'
09FBA 0010     (00596)          DATA D'16'
09FBB 0018     (00597)          DATA D'24'
09FBC 0020     (00598)          DATA D'32'
09FBD 0028     (00599)          DATA D'40'
09FBE 0030     (00600)          DATA D'48'
09FBF 0038     (00601)          DATA D'56'
09FC0 0003     (00602)          DATA D'3'
09FC1 000B     (00603)          DATA D'11'
09FC2 0013     (00604)          DATA D'19'
09FC3 001B     (00605)          DATA D'27'
09FC4 0023     (00606)          DATA D'35'
09FC5 002B     (00607)          DATA D'43'
09FC6 0033     (00608)          DATA D'51'
09FC7 003B     (00609)          DATA D'59'
09FC8 0006     (00610)          DATA D'6'
09FC9 000E     (00611)          DATA D'14'
09FCA 0016     (00612)          DATA D'22'
09FCB 001E     (00613)          DATA D'30'
09FCC 0026     (00614)          DATA D'38'
09FCD 002E     (00615)          DATA D'46'
09FCE 0036     (00616)          DATA D'54'
09FCF 003E     (00617)          DATA D'62'
```

```
09FD0 0005      (00618)          DATA D'5'
09FD1 000D      (00619)          DATA D'13'
09FD2 0015      (00620)          DATA D'21'
09FD3 001D      (00621)          DATA D'29'
09FD4 0025      (00622)          DATA D'37'
09FD5 002D      (00623)          DATA D'45'
09FD6 0035      (00624)          DATA D'53'
09FD7 003D      (00625)          DATA D'61'
09FD8 000C      (00626)          DATA D'12'
09FD9 0004      (00627)          DATA D'4'
09FDA 001C      (00628)          DATA D'28'
09FDB 0014      (00629)          DATA D'20'
09FDC 002C      (00630)          DATA D'44'
09FDD 0024      (00631)          DATA D'36'
09FDE 003C      (00632)          DATA D'60'
09FDF 0034      (00633)          DATA D'52'
09FE0 000F      (00634)          DATA D'15'
09FE1 0007      (00635)          DATA D'7'
09FE2 001F      (00636)          DATA D'31'
09FE3 0017      (00637)          DATA D'23'
09FE4 002F      (00638)          DATA D'47'
09FE5 0027      (00639)          DATA D'39'
09FE6 003F      (00640)          DATA D'63'
09FE7 0037      (00641)          DATA D'55'
09FE8 000A      (00642)          DATA D'10'
09FE9 0002      (00643)          DATA D'2'
09FEA 001A      (00644)          DATA D'26'
09FEB 0012      (00645)          DATA D'18'
09FEC 002A      (00646)          DATA D'42'
09FED 0022      (00647)          DATA D'34'
09FEE 003A      (00648)          DATA D'58'
09FEF 0032      (00649)          DATA D'50'
09FF0 0009      (00650)          DATA D'9'
09FF1 0001      (00651)          DATA D'1'
09FF2 0019      (00652)          DATA D'25'
09FF3 0011      (00653)          DATA D'17'
09FF4 0029      (00654)          DATA D'41'
09FF5 0021      (00655)          DATA D'33'
09FF6 0039      (00656)          DATA D'57'
09FF7 0031      (00657)          DATA D'49'
09FF8 0000      (00658) NESIS    DATA 4D'0'                        NCH
 ...
09FFC 0000      (00659) NESS     DATA 10'0'                        NESS=2(ERE, # FOR BLOCK
 ...
```

```
                  (00660) ;                                        1),NESS-1(ERR, # FOR BL,
09E00 0000        (00661) SISPS   DATA 0'0'                        NESS(ERR, # FOR BLOCK 1)
09E01 0000        (00662) REGS    DATA 80'0'                       DATA MEM, FOR REGISTER R
 ...
                  (00663) ;                                        1-R7
                  (00664) *
                  (00665) *  END OF DATA MEMORY
                  (00666)         EJECT
```

```
                    (00667) *
                    (00668) *
                    (00669) *
                    (00670) *********************************************
                    (00671) ;  CSPU PROGRAM STARTS HERE
                    (00672) *********************************************
09F08 0800          (00673)         EVEN
09F0A 9F1C          (00674) GTIOSTS DATA IODSPTS
09F0B ACSE          (00675) GTIGFMS DATA GTIDLSS+2
09F0C 00000000      (00676) R1SAV   DATA 1E'0,0'
09F0E 00000000      (00677) R2SAV   DATA 1E'0,0'
09F10 00000000      (00678) R3SAV   DATA 1E'0,0'
09F12 00000000      (00679) R4SAV   DATA 1E'0,0'
09F14 00000000      (00680) R5SAV   DATA 1E'0,0'
09F16 00000000      (00681) R6SAV   DATA 1E'0,0'
09F18 00000000      (00682) R7SAV   DATA 1E'0,0'
                    (00683) *
                    (00684) ;
                    (00685) ;
                    (00686) ;  DEFINITION FOR CSW AND PATCH TO AVOID 16K INTERRUPT PROBLEM
                    (00687) ;
                    (00688)         EVEN
09F1A 9F1C1014      (00689) CSWSD24 CSW CSSSTDR,IODSPTS              CSW OF TRANSMITTER
09F1C 2000          (00690) IODSPTS NOP                              ***FOR DEBUG ONLY***
09F1D CC000570      (00691)         MOVZM INFULL                     INITIALIZE
09F1F CC000571      (00692)         MOVZM OUTFUL
09F21 0800          (00693) IODSPTS EVEN
09F22 DA000575      (00694) TSTSO   SRBCL 0,XGO                      TRANSMIT REQUEST IS TIED
09F24 80009FA2      (00695)         JMP XMITS                        G3=1 SO EXECUTE TRANSMIT
                    (00696) ;                                        TER("XMIT")
09F26 DE000580      (00697)         SRBSL 0,APDNFLS
09F28 2005          (00698)         NOP *L+6
09F29 0800          (00699)         EVEN
09F2A CC000580      (00700)         MOVZM APDNFLS
09F2C 0F70          (00701)         RET
09F2D 0800          (00702)         EVEN
09F2E 80009F3A      (00703)         JMP TSTS1                        WHEN WE COME BACK TEST 1
09F30 E80FFFCF      (00704) TRANSRA MOVEM CLRSG3,SYSFLGS             ***FOR TRAN TIMING ONLY
                    (00705) ;                                        ***
09F32 DE000580      (00706)         SRBSL 0,APDNFLS                  HAS APDONE HAPPENED?
09F34 2005          (00707)         NOP *L+6
09F35 0800          (00708)         EVEN
09F36 CC000580      (00709)         MOVZM APDNFLS
09F38 0F70          (00710)         RET
```

```
09E39 0800       (00711)          EVEN
09E3A DE000560   (00712) TSTS1    SMBSL 0,IDPS                       DO WE HAVE NEW A/D SPEEC
                 (00713) ;                                           H TO PROCESS?
09E3C 80009EAA   (00714)          JMP MOVES                          YES
09E3E DE000580   (00715)          SMBSL 0,APDNFLS
09E40 2005       (00716)          ROP #L+6
09E41 0800       (00717)          EVEN
09E42 CC000580   (00718)          MOVZM APDNFLS
09E44 0E70       (00719)          RET
09E45 0800       (00720)          EVEN
09E46 80009E52   (00721)          JMP TSTS2
09E48 E8020570   (00722) MOVESRA  MOVLM 1,INFULL                     SAY INPUT (TO AP) FULL
09E4A DE000580   (00723) MOVSRA1  SMBSL 0,APDNFLS                    HAS APDONE HAPPENED?
09E4C 2005       (00724)          ROP #L+6
09E4D 0800       (00725)          EVEN
09E4E CC000580   (00726)          MOVZM APDNFLS
09E50 0E70       (00727)          RET
09E51 0800       (00728)          EVEN
09E52 FA000574   (00729) TSTS2    SMBCL 0,RGO                        RECEIVE REQUEST IS TIED
                 (00730) ;                                           TO RGO
09E54 8000A496   (00731)          JMP XRECVS                         GO=1 SO EXECUTE RECEIVER
                 (00732) ;                                           ("XRECV")
09E56 DE000580   (00733)          SMBSL 0,APDNFLS
09E58 2005       (00734)          ROP #L+6
09E59 0800       (00735)          EVEN
09E5A CC000580   (00736)          MOVZM APDNFLS
09E5C 0E70       (00737)          RET
09E5D 0800       (00738)          EVEN
09E5E 80009E6E   (00739)          JMP TSTS3                          WHEN WE COME BACK TEST G
                 (00740) ;                                           3!
                 (00741) RECVSRA  EVEN
09E60 E809EECE   (00742)          MOVLM CLRSGO,SYSFLGS               ***FOR RECV TIMING ONLY
                 (00743) ;                                           ***
09E62 9031FFFF   (00744)          MOVIR R1,-1                        -1 IMPLIES THAT RCVR IS
                 (00745) ;                                           OFF
09E64 E0100581   (00746)          MOVRM R1,RCVOFF                    WHICH LETS "VMOV1" STALL
09E66 DE000580   (00747)          SMBSL 0,APDNFLS                    HAS APDONE HAPPENED?
09E68 2005       (00748)          ROP #L+6
09E69 0800       (00749)          EVEN
09E6A CC000580   (00750)          MOVZM APDNFLS
09E6C 0E70       (00751)          RET
09E6D 0800       (00752)          EVEN
09E6E DE00056A   (00753) TSTS3    SMBSL 0,OUTS                       D/A READY FOR MORE OUTPU
                 (00754) ;                                           T?
```

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09F70 R000A6E8 (00755)          JMP LDADES                         YES
09F72 DE000580 (00756)          SMBSL 0,APDNFLS
09F74 2005     (00757)          HOP #L+6
09F75 0800     (00758)          EVEN
09F76 CC000580 (00759)          MOVZM APDNFLS
09F78 0F70     (00760)          RET
09F79 0800     (00761)          EVEN
09F7A R0009F22 (00762)          JMP TSTS0
09F7C CC000571 (00763) LOBUSRA  MOVZM OUTFUL                       SAY AP OUT BUFF EMPTY
09F7E DE000580 (00764) LOBSRA1  SMBSL 0,APDNFLS                    HAS APDONE HAPPENED?
09F80 2005     (00765)          HOP #L+6
09F81 0800     (00766)          EVEN
09F82 CC000580 (00767)          MOVZM APDNFLS
09F84 0F70     (00768)          RET
09F85 0800     (00769)          EVEN
09F86 R0009F22 (00770)          JMP TSTS0
               (00771) ;
               (00772)          EJECT
```

```
                    (00773) ;
                    (00774) ;
                    (00775) ;  EXECUTE INSTRUCTIONS
                    (00776) ;
                    (00777)           EVEN
09E88 FC209C8F     (00778) CNTP1S   ADD4R R2,EIGTENS          INCREMENT COUNTER R2 BY
                                                               18
                    (00779) ;
                    (00780)           EVEN
                    (00781) ;
                    (00782) ;  ERROR INDICATORS
                    (00783) ;
                    (00784) *
09E8A D2009C91     (00785) ERR1S    SMB 0,ERRS                'ERROR CONDITION FOR TES
                    (00786) ;                                  T 1
09E8C 80009E92     (00787)          JMP ERRSRET               'ERROR:INPUT SPEECH BUFF
                    (00788) ;                                  ER IS INPUT TWICE
09E8E D2109C91     (00789) ERR2S    SMB 1,ERRS                'ERROR CONDITION FOR TES
                    (00790) ;                                  T 2
09E90 80009E92     (00791)          JMP ERRSRET               'ERROR:XMITTER DATA BUFF
                    (00792) ;                                  ER IS OUTPUT TWICE
09E92 E8000573     (00793) ERRSRET  MOVEM 0,INITS             'RESET INIT FOR INITIALI
                    (00794) ;                                  ZATION AGAIN
09E94 80009E30     (00795)          JMP TRANSRA               'GO TO XMITTER RETURN
                    (00796) ;
                    (00797) ;;
                    (00798) ;
09E96 D2209C91     (00799) ERR3S    SMB 2,ERRS                'ERROR CONDITION FOR TES
                    (00800) ;                                  T 3
09E98 80009E9E     (00801)          JMP ERRSREP               'ERROR:RECV DATA BUFFER
                    (00802) ;                                  IS UNLOADED TWICE
09E9A D2309C91     (00803) ERR4S    SMB 3,ERRS                'ERROR CODITION FOR TEST
09E9C 80009E9E     (00804)          JMP ERRSREP               'ERROR:RECV SPEECH BUFFE
                    (00805) ;                                  R IS UNLOADED TWICE
09E9E E8020573     (00806) ERRSREP  MOVEM 1,INITS             'CLEAR INIT
09EA0 80009E60     (00807)          JMP RECVSRA               'RETURN
                    (00808)          EJECT
```

```
                   (00809) *
                   (00810) *
                   (00811) *
                   (00812) *
                   (00813) ***************************************************
                   (00814) *
                   (00815) * DOUBLE:XMIT.TXT
                   (00816) *
                   (00817) * TO UNLOAD SPEECH SAMPLES FROM DOUBLE BUFFER
                   (00818) *
                   (00819) ************************************************
                   (00820) *
                   (00821)          EVEN
09FA2 CC000575     (00822) XMITS    MOVZM,XGO                         CLEAR XMIT GOO FLG
09FA4 F84FFFCF     (00823)          MOVLM SETSG3,SYSFLGS
09FA6 F8020566     (00824)          MOVLM 1,ANAS                      'RESET THE ANALYZER READ
                   (00825) ;                                          Y FLAG
09FA8 80009FE8     (00826)          JMP SREUFS
                   (00827)          EJECT
```

```
                    (00828) ***** MOVE SPEECH DATA FROM NIN1,NIN2 TO INPB
09FAA E5000570 (00829) MOVES   SMPCL 0,INFULL
09FAC 80009F4A (00830)         JMP MOVSRA1                   WAIT TILLAP HAS TAKEN LA
               (00831) ;                                     ST ONE
09FAE F8A1FFCF (00832)         MOVLM SETSC3,SYSFLGS
09FB0 F8020560 (00833)         MOVLM 1,INPS                  CLEAR A/D INTERRUPT FLAG
09FB2 02A0     (00834)         CCS 2                         FROM SRB=1...
09FB3 0660     (00835)         SCS 3                         TO SRB=2
09FB4 0200     (00836)         CCS 5                         FROM MRB=2...
09FB5 06C0     (00837)         SCS 4                         TO MRB=1
09FB6 9040003E (00838)         MOVIR R4,BLTH1-1              NUMBER OF FULL WORDS/BLO
               (00839) ;                                     CK
09FB8 F2000560 (00840)         CMPMZ IFLGS                   'IS IFLG EQ 0?
09FBA 80109FD0 (00841)         JMP FLBS,EQ                   'GOTO FLB IF IT IS EQ
09FBC 90200F1E (00842)         MOVIR R2,NIN2S-2              'PICK UP DATA FROM NIN2
09FBE D72881B0 (00843) UNLS    RMOVEL R2,R4,INPBS            'MOVE BUFFER AS 2 BLOCKS
09FC0 EF000580 (00844)         SMPSL 0,APDNFLS               HAS APDONE HAPPENED?
09FC2 2005     (00845)         BOP #L+6
09FC3 0800     (00846)         EVEN
09FC4 CC000580 (00847)         MOVZM APDNFLS
09FC6 0F70     (00848)         RET
09FC7 0800     (00849)         EVEN
09FC8 90200F9A (00850)         MOVIR R2,NIN2S-2+BLTH12
09FCA 9040003C (00851)         MOVIR R4,BLTH1-2
09FCC D7238DFC (00852)         RMOVEL R2,R4,INPBS+BLTH12
09FCE 80009FF2 (00853)         JMP FLB1S
09FD0 90200E28 (00854) FLBS    MOVIR R2,NIN1S-2
09FD2 D72880B0 (00855)         RMOVEL R2,R4,INPBS
09FD4 EF000580 (00856)         SMPSL 0,APDNFLS               HAS APDONE HAPPENED?
09FD6 2005     (00857)         BOP #L+6
09FD7 0800     (00858)         EVEN
09FD8 CC000580 (00859)         MOVZM APDNFLS
09FDA 0F70     (00860)         RET
09FDB 0800     (00861)         EVEN
09FDC 90200EA1 (00862)         MOVIR R2,NIN1S-2+BLTH12
09FDE 9040003C (00863)         MOVIR R4,BLTH1-2
09FE0 D72880FC (00864)         RMOVEL R2,R4,INPBS+BLTH12
09FE2 02A0     (00865) FLB1S   CCS 3                         FROM SRB=2...
09FE3 06A0     (00866)         SCS 2                         TO SRB=1
09FE4 F80FFFCF (00867)         MOVLM CLRSC3,SYSFLGS
09FE6 80009F4B (00868)         JMP MOVESRA                   BACK TO DISPATCH
               (00869)         EJECT
```

```
                    (00870) ***** SERIALIZE SIDEBAND AND MAINBAND PARAMETERS
                    (00871) SERBPS  EVEN
09FF8 0200          (00872)         CCS 3                                  FROM SRB=2...
09FF9 0EA0          (00873)         SCS 2                                  TO SRB=1
09FFA 0260          (00874)         CCS 5                                  FROM MRB=2...
09FFB 06C0          (00875)         SCS 3                                  TO MRB=1
09FFC DE0005A0      (00876)         SMBSE 0,APDFLS                         HAS APDONE HAPPENED?
09FFE 2021          (00877)         HOP *L+33                              NO, HOP TO EVEN LOC AFTE
                    (00878) ;                                              R RET
09FFF 0800          (00879)         EVEN
09FF0 CC0005A0      (00880)         MOVZW APDFLS
09FF2 F1109F0C      (00881)         STORE R1,R1SAV
09FF3 F1209F0E      (00882)         STORE R2,R2SAV
09FF6 F1309F10      (00883)         STORE R3,R3SAV
09FF8 F1409F12      (00884)         STORE R4,R4SAV
09FFA F1509F14      (00885)         STORE R5,R5SAV
09FFC F1609F16      (00886)         STORE R6,R6SAV
09FFE F1709F18      (00887)         STORE R7,R7SAV
0A000 0F70          (00888)         RET
0A001 0800          (00889)         EVEN
0A002 A6109F0C      (00890)         LOAD R1,R1SAV
0A004 A6209F0E      (00891)         LOAD R2,R2SAV
0A006 A6309F10      (00892)         LOAD R3,R3SAV
0A008 A6409F12      (00893)         LOAD R4,R4SAV
0A00A A6509F14      (00894)         LOAD R5,R5SAV
0A00C A6609F16      (00895)         LOAD R6,R6SAV
0A00E A6709F18      (00896)         LOAD R7,R7SAV
0A010 90209202      (00897)         MOVIR R2,ZROS-1
0A012 9040003E      (00898)         MOVIR R4,LSEN1-1
0A014 D728BC0E      (00899)         BMOVEL R2,R4,SENS                      TRANSFER 3 BLOCKS OF 0'S
0A016 90209202      (00900)         MOVIR R2,ZROS-1
0A018 9040003E      (00901)         MOVIR R4,LSEN1-1
0A01A D728BCBA      (00902)         BMOVEL R2,R4,SENS+2*LSEN1
0A01C 90209202      (00903)         MOVIR R2,ZROS-1
0A01E 9040003C      (00904)         MOVIR R4,LSEN1-2
0A020 D728BE06      (00905)         BMOVEL R2,R4,SENS+4*LSEN1
                    (00906) *
                    (00907)         EVEN
0A022 DE0005A0      (00908)         SMBSE 0,APDFLS                         HAS APDONE HAPPENED?
0A024 2021          (00909)         HOP *L+34                              NO, HOP TO EVEN LOC AFTE
                    (00910) ;                                              R RET
0A025 0800          (00911)         EVEN
0A026 CC0005A0      (00912)         MOVZW APDFLS
0A028 F1109F0C      (00913)         STORE R1,R1SAV
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0A02A F1209E0E (00914)          STORE R2,R2SAV
0A02C F1309E10 (00915)          STORE R3,R3SAV
0A02E F1409E12 (00916)          STORE R4,R4SAV
0A030 F1509E14 (00917)          STORE R5,R5SAV
0A032 F1609E16 (00918)          STORE R6,R6SAV
0A034 F1709E18 (00919)          STORE R7,R7SAV
0A036 0E70     (00920)          RET
0A037 0800     (00921)          EVEN
0A038 A6109E0C (00922)          LOAD R1,R1SAV
0A03A A6209E0E (00923)          LOAD R2,R2SAV
0A03C A6309E10 (00924)          LOAD R3,R3SAV
0A03E A6409E12 (00925)          LOAD R4,R4SAV
0A040 A6509E14 (00926)          LOAD R5,R5SAV
0A042 A6609E16 (00927)          LOAD R6,R6SAV
0A044 A6709E18 (00928)          LOAD R7,R7SAV
               (00929) ;
0A046 00200001 (00930)          MOVIR R2,1                               SKIP SYNC BIT
0A048 0E40     (00931)          CLR R4
0A049 0800     (00932)          EVEN
0A04A E0509C8C (00933)          MOVMR R5,PARMSM2
0A04C E06B6A00 (00934) LOOPS    MOVMR R6,OPRS(R4)                        STORE THE PARAMETER IN R
               (00935) ;                                                 6
0A04E DE000580 (00936)          SMRSL 0,APDNELS                          HAS APDONE HAPPENED?
0A050 2021     (00937)          HOP $L+34                                NO, HOP TO EVEN LOC AFTE
               (00938) ;                                                 R RET
0A051 0800     (00939)          EVEN
0A052 CC000580 (00940)          MOVZM APDNELS
0A054 F1109E0C (00941)          STORE R1,R1SAV
0A056 F1209E0E (00942)          STORE R2,R2SAV
0A058 F1309E10 (00943)          STORE R3,R3SAV
0A05A F1409E12 (00944)          STORE R4,R4SAV
0A05C F1509E14 (00945)          STORE R5,R5SAV
0A05E F1609E16 (00946)          STORE R6,R6SAV
0A060 F1709E18 (00947)          STORE R7,R7SAV
0A062 0E70     (00948)          RET
0A063 0800     (00949)          EVEN
0A064 A6109E0C (00950)          LOAD R1,R1SAV
0A066 A6209E0E (00951)          LOAD R2,R2SAV
0A068 A6309E10 (00952)          LOAD R3,R3SAV
0A06A A6409E12 (00953)          LOAD R4,R4SAV
0A06C A6509E14 (00954)          LOAD R5,R5SAV
0A06E A6609E16 (00955)          LOAD R6,R6SAV
0A070 A6709E18 (00956)          LOAD R7,R7SAV
0A072 8OBA9CA0 (00957)          JOP WITDXIS(R5)
```

```
                  (00958) *
                  (00959) *
                  (00960)         EVEN
0A074 2A5C        (00961) BIT5S   SBBCL 5,R6             IS PARM BUFFER BIT 5 CLE
                  (00962) ;                              AR?
0A075 D204BC0F    (00963)         SBB 0,SENS(R2)         OTHERWISE, SET LOCATION
                  (00964) ;                              OF SEN ARRAY TO BE A 1
0A077 2621        (00965)         INCR R2,1              INCREMENT THE COUNTER R2
                  (00966) *
                  (00967)         EVEN
0A078 2A4C        (00968) BIT4S   SBBCL 4,R6             IS PARM BUFFER BIT 4 CLE
                  (00969) ;                              AR?
0A079 D204BC0F    (00970)         SBB 0,SENS(R2)         OTHERWISE, SET LOCATION
                  (00971) ;                              OF SEN ARRAY TO BE A 1
0A07B 2621        (00972)         INCR R2,1              INCREMENT THE COUNTER R2
                  (00973) *
                  (00974)         EVEN
0A07C 2A3C        (00975) BIT3S   SBBCL 3,R6             IS PARM BUFFER BIT 3 CLE
                  (00976) ;                              AR?
0A07D D204BC0F    (00977)         SBB 0,SENS(R2)         OTHERWISE, SET LOCATION
                  (00978) ;                              OF SEN ARRAY TO BE A 1
0A07F 2621        (00979)         INCR R2,1              INCREMENT THE COUNTER R2
                  (00980) *
                  (00981)         EVEN
0A080 2A2C        (00982) BIT2S   SBBCL 2,R6             IS PARM BUFFER BIT 2 CLE
                  (00983) ;                              AR?
0A081 D204BC0F    (00984)         SBB 0,SENS(R2)         OTHERWISE, SET LOCATION
                  (00985) ;                              OF SEN ARRAY TO BE A 1
0A083 2621        (00986)         INCR R2,1              INCREMENT THE COUNTER R2
                  (00987) *
                  (00988)         EVEN
0A084 2A1C        (00989) BIT1S   SBBCL 1,R6             IS PARM BUFFER BIT 1 CLE
                  (00990) ;                              AR?
0A085 D204BC0F    (00991)         SBB 0,SENS(R2)         OTHERWISE, SET LOCATION
                  (00992) ;                              OF SEN ARRAY TO BE A 1
0A087 2621        (00993)         INCR R2,1              INCREMENT THE COUNTER R2
                  (00994) *
                  (00995)         EVEN
0A088 2A0C        (00996) BIT0S   SBBCL 0,R6             IS PARM BUFFER BIT 0 CLE
                  (00997) ;                              AR?
0A089 D204BC0F    (00998)         SBB 0,SENS(R2)         OTHERWISE, SET LOCATION
                  (00999) ;                              OF SEN ARRAY TO BE A 1
0A08B 2621        (01000)         INCR R2,1              INCREMENT THE COUNTER R2
                  (01001)         EVEN
```

```
                    *
0A08C 2631                INCR R3,1                               INCREMENT THE PARAMETER
                    ;                                             COUNTER
0A08D 0800                EVEN
0A08E 8E50A04C            DJJP R5,LOOPS                           DECREMENT R5,JUMP IF R5
                    ;                                             IS +VE
                    *
                    *
                    ;  SERIALIZE THE VERY LAST PARAMETER(I.E. OTG)
                    ;  AFTER INSERTING 18 ZEROES
                    *
                          EVEN
0A090 1E0005B0            SMOSE 0,APDOFLS                         HAS APDONE HAPPENED?
0A092 2621                HOP *L+3                                NO, HOP TO EVEN LOC AFTE
                    ;                                             R RET
0A093 0800                EVEN
0A094 CC0005B0            MOVZB APDOFLS
0A096 F1109E0C            STORE R1,R1SAV
0A098 F1209E0E            STORE R2,R2SAV
0A09A F1309E10            STORE R3,R3SAV
0A09C F1409E12            STORE R4,R4SAV
0A09E F1509E14            STORE R5,R5SAV
0A0A0 F1609E16            STORE R6,R6SAV
0A0A2 F1709E18            STORE R7,R7SAV
0A0A4 0E70                RET
0A0A5 0800                EVEN
0A0A6 A6109E0C            LOAD R1,R1SAV
0A0A8 A6209E0E            LOAD R2,R2SAV
0A0AA A6309E10            LOAD R3,R3SAV
0A0AC A6409E12            LOAD R4,R4SAV
0A0AE A6509E14            LOAD R5,R5SAV
0A0B0 A6609E16            LOAD R6,R6SAV
0A0B2 A6709E18            LOAD R7,R7SAV
0A0B4 FC209CBE            ADDMR R2,EIGTENS                        SKIP 18 LOCATIONS IN SEN
0A0B6 DA1BEA00            SSBCL 1,OPBS(R4)                        IS BIT 1 OF OTG SET?SKIP
0A0B8 D204BC0E            SMP 0,SENS(R2)                          INCREMENT SEN ARRAY IF I
                    ;                                             T IS NOT
0A0BA 2621                INCR R2,1                               INCREMENT COUNTER R2
0A0BB 0800                EVEN
0A0BC DA0BEA00            SKBCL 0,OPBS(R4)                        CHECK IF BIT 0 OF OTG SE
                    ;                                             T? SKIP IF NOT
0A0BE D204BC0E            SMP 0,SENS(R2)                          INCREMENT SEN ARRAY IF I
                    ;                                             T IS NOT
0A0C0 2621                INCR R2,1                               INCREMENT COUNTER R2
```

```
0A0C1 0600                 EVEN
                    *
                    *
                    *
                    ;  SERIALIZE THE QUANTIZED DCT COEFS
                    ;  AND ASSIGNING HORIZONTAL CODING
                    *
0A0C2 F050000F             MOVPR R5,FORFORS                  MOVE FORTY FOUR IN R5
0A0C4 2752                 DECR R5,2
0A0C5 0600                 EVEN
0A0C6 F070800F             MOVRP R7,IBITS                    SAVE THE FIRST IBIT VALU
                    ;                                         E
0A0C8 2771                 DECR R7,1                         DECREMENT R7 BY 1
0A0C9 0600                 EVEN
0A0CA 3A71                 LLS R7,1                          SHIFT LEFT BY 1
0A0CB 0600                 EVEN
                    **************************************************************
                    *  SPECIAL CODE TO CORRECT FOR IBIT=0 CASE 5/16/80
0A0CC 0270                 TEST R7                           WHEN IBIT=0,R7<0 AND A I
                    ;                                         S NG!
0A0CD 0600                 EVEN                              SO TEST & JUMP AROUND SE
                    ;                                         RIALIZATION SINCE
0A0CE 8030A2E0             JMP ENDSRS,LT                     IBIT=0 IMPLIES NO BITS T
                    ;                                         O SERIRIALIZE!!
                    ****************************************************************
0A0D0 808E9C58             JMP RIBDA2S(R7)                   GOTO THE CORR.SERIALIZAT
                    ;                                         ION ROUTINE
                    *
                    *
                           EVEN
                    *
                    *
0A0D2 F070800F      DBIT4S MOVRP R7,IBITS                    SAVE THE 1ST IBIT VALUE
0A0D3 0040                 CLR R4
0A0D5 0600                 EVEN
0A0D6 F2788000      DBIT4S1 CMPRP R7,IBITS(R4)               COMPARE THE BIT ASSIGNME
                    ;                                         NT WITH THE MARK
0A0D8 8020A110             JMP DBIT3S,GT                     GOTO NEXT BIT DECODING R
                    ;                                         OUTINE IF BIT ASSIGN. CH
                    ;                                         ANGES
0A0DA DE0005E0             SKRSL 0,APDNFLS                   HAS APDONE HAPPENED?
0A0DC 2621                 HOP *L434                         NO, HOP TO EVEN LOC AFTE
                    ;                                         R RET
0A0DE 0600                 EVEN
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0ADDE CC000586 (01090)          MOVZ9 APDOELS
0ADE0 E1109E0C (01091)          STORE R1,R1SAV
0ADE2 E1209E0E (01092)          STORE R2,R2SAV
0ADE4 E1309E10 (01093)          STORE R3,R3SAV
0ADE6 E1409E12 (01094)          STORE R4,R4SAV
0ADE8 E1509E14 (01095)          STORE R5,R5SAV
0ADEA E1609E16 (01096)          STORE R6,R6SAV
0ADEC E1709E18 (01097)          STORE R7,R7SAV
0ADEE 0E70     (01098)          RET
0ADEF 0800     (01099)          EVEN
0ADF0 A6109E0C (01100)          LOAD R1,R1SAV
0ADF2 A6209E0E (01101)          LOAD R2,R2SAV
0ADF4 A6309E10 (01102)          LOAD R3,R3SAV
0ADF6 A6409E12 (01103)          LOAD R4,R4SAV
0ADF8 A6509E14 (01104)          LOAD R5,R5SAV
0ADFA A6609E16 (01105)          LOAD R6,R6SAV
0ADFC A6709E18 (01106)          LOAD R7,R7SAV
0ADFE 0A48EA0E (01107)          SMRCL 4,OTDCTS(R4)          SKIP IF BIT 4 OF OCT(R4)
0A100 D2048C0E (01108)          SMR 0,SENS(R2)
0A102 2641     (01109)          INCR R4,1
0A103 0800     (01110)          EVEN
0A104 2621     (01111)          INCR R2,1                   INCREMENT THE BUFFER POS
               (01112) ;                                    ITION COUNTER
0A105 0800     (01113)          EVEN
0A106 8C50A0E6 (01114)          DJP R5,DBIT4S1              CHECK IF R5 +VE
0A108 F0509C8E (01115)          MOVMR R5,FORFORS            RELOAD THE COUNTER WITH
               (01116) ;                                    44
0A10A F2209C86 (01117)          CMPMR R2,POST3S             IS R2 GREATER THAN POST
               (01118) ;                                    3
0A10C 84209E8E (01119)          XCT CNTR1S,LE               ADD 18 TO R2 IF LESS THA
               (01120) ;                                    N OR EQUAL
0A10E 8000A0E6 (01121)          JMP DBIT4S1                 GO BACK TO DBITS1
               (01122) *
               (01123) *
               (01124) ;  SERIALIZATION FOR BIT 3
               (01125) *
               (01126)          EVEN
0A110 F2209C89 (01127) DBIT3S   CMPMR R2,POST4S
0A112 9E10A2EE (01128)          JMP ENDSPS,EO
0A114 DE000580 (01129)          SMGSL 0,APDNELS             HAS APDONE HAPPENED?
0A116 2021     (01130)          HOP #L+34                   NO, HOP TO EVEN LOC AFTE
               (01131) ;                                    R RET
0A117 0800     (01132)          EVEN
0A118 CC000586 (01133)          MOVZ9 APDOELS
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0A11A E1109E0C (01134)          STORE R1,R1SAV
0A11C E1209E0E (01135)          STORE R2,R2SAV
0A11E E1309E10 (01136)          STORE R3,R3SAV
0A120 E1409E12 (01137)          STORE R4,R4SAV
0A122 E1509E14 (01138)          STORE R5,R5SAV
0A124 E1609E16 (01139)          STORE R6,R6SAV
0A126 E1709E18 (01140)          STORE R7,R7SAV
0A128 0E70     (01141)          RET
0A129 0800     (01142)          EVEN
0A12A A6109E0C (01143)          LOAD R1,R1SAV
0A12C A6209E0E (01144)          LOAD R2,R2SAV
0A12E A6309E10 (01145)          LOAD R3,R3SAV
0A130 A6409E12 (01146)          LOAD R4,R4SAV
0A132 A6509E14 (01147)          LOAD R5,R5SAV
0A134 A6609E16 (01148)          LOAD R6,R6SAV
0A136 A6709E18 (01149)          LOAD R7,R7SAV
0A138 E07880DE (01150)          MOVBR R7,IBITS(R4)                   SAVE THE NEXT IBIT VALUE
0A13A 0040     (01151)          CLR R4
0A13B 0800     (01152)          EVEN
0A13C E27880DF (01153) DBIT3S1 CMPBR R7,IBITS(R4)                    COMPARE THE BIT ASSIGNME
               (01154) :                                             NT WITH THE MARK
0A13E 8020A176 (01155)          JMP DBIT2S,GT                        FI NOT EQUAL,GOTO DECODE
0A140 DE0005E0 (01156)          SENSE 0,APDNFLS                      HAS APDONE HAPPENED?
0A142 2021     (01157)          HOP #L+34                            NO, HOP TO EVEN LOC AFTE
               (01158) :                                             R RET
0A143 0800     (01159)          EVEN
0A144 CC0005E0 (01160)          MOVZM APDNFLS
0A146 E1109E0C (01161)          STORE R1,R1SAV
0A148 E1209E0E (01162)          STORE R2,R2SAV
0A14A E1309E10 (01163)          STORE R3,R3SAV
0A14C E1409E12 (01164)          STORE R4,R4SAV
0A14E E1509E14 (01165)          STORE R5,R5SAV
0A150 E1609E16 (01166)          STORE R6,R6SAV
0A152 E1709E18 (01167)          STORE R7,R7SAV
0A154 0E70     (01168)          RET
0A155 0800     (01169)          EVEN
0A156 A6109E0C (01170)          LOAD R1,R1SAV
0A158 A6209E0E (01171)          LOAD R2,R2SAV
0A15A A6309E10 (01172)          LOAD R3,R3SAV
0A15C A6409E12 (01173)          LOAD R4,R4SAV
0A15E A6509E14 (01174)          LOAD R5,R5SAV
0A160 A6609E16 (01175)          LOAD R6,R6SAV
0A162 A6709E18 (01176)          LOAD R7,R7SAV
               (01177) *
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0A161 EA358201 (01178)          SBBCL 3,OTDCIS(R4)     SKIP IF BIT 3 OF DCT(R4)
0A164 E2298C0E (01179)          SBR 0,SENS(R2)
0A168 2611     (01180)          IACE R4,1
0A169 C800     (01181)          EVEN
0A16A 2621     (01182)          IACE R2,1              INCREMENT THE BUFFER POS
               (01183) :                               ITION COUNTER
0A16E 0800     (01184)          EVEN
0A16C EC50F13C (01185)          BIE R5,DBIT3S1         GO BACK TO DBIT3S1
0A16E E0509C8E (01186)          MOVHE R5,FOREORS       RELOAD THE COUNTER WITH
               (01187) :                               44
0A170 E2209C86 (01188)          CMPMR R2,POST3S        IS R2 GREATER THAN POST
               (01189) :                               3
0A172 E4203E88 (01190)          ACI CNTPIS,IE          ADD 18 TO LOOP COUNTER I
               (01191) :                               F LESS THAN OR EQUAL TO
0A173 E000A13C (01192)          JMP DBIT3S1            GO BACK TO DBIT3S1
               (01193) *
               (01194) *
               (01195) :  SERIALIZATION FOR BIT 2
               (01196) *
               (01197)          EVEN
               (01198) DBIT2S   EVEN
0A176 E2209CE9 (01199)          CMPMR R2,POS14S
0A178 H010A2EB (01200)          JPP ENDSRS,EQ
0A17A DE000580 (01201)          SBBSL 0,APDNELS        HAS APDONE HAPPENED?
0A17C 2021     (01202)          HOP #1,+44             NO, HOP TO EVEN LOC AFTE
               (01203) :                               R RET
0A17E 0800     (01204)          EVEN
0A17E CC000580 (01205)          MOVZM APDNELS
0A180 E1109E0C (01206)          STORE R1,R1SAV
0A182 E1209E0E (01207)          STORE R2,R2SAV
0A184 E1309E10 (01208)          STORE R3,R3SAV
0A186 E1409E12 (01209)          STORE R4,R4SAV
0A188 E1509E14 (01210)          STORE R5,R5SAV
0A18A E1609E16 (01211)          STORE R6,R6SAV
0A18C E1709E18 (01212)          STORE R7,R7SAV
0A18E 0E70     (01214)          LFT
0A18E 0800     (01214)          EVEN
0A190 A6109E0C (01215)          LOAD R1,R1SAV
0A192 A6209E0E (01216)          LOAD R2,R2SAV
0A194 A6309E10 (01217)          LOAD R3,R3SAV
0A196 A6409E12 (01218)          LOAD R4,R4SAV
0A198 A6509E14 (01219)          LOAD R5,R5SAV
0A19A A6609E16 (01220)          LOAD R6,R6SAV
0A19C A6709E18 (01221)          LOAD R7,R7SAV
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0A19E E0780006 (01222)          MOVBR R7,IBITS(R4)           SAVE THE IBIT VALUE
0A1A0 0040     (01223)          CLR R4
0A1A1 0800     (01224)          EVEN
0A1A2 F2780 0F (01225) DBIT2S1  CMPHB R7,IBITS(R4)           COMPARE THE BIT ASSIGNME
               (01226) ;                                     NT WITH THE MARK
0A1A4 8020A1DC (01227)          JMP DBITS,GF                 IF NOT EQUAL,GOTO DECODE
0A1A6 DE000580 (01228)          SBRSE 0,APDFLGS              HAS APDONE HAPPENED?
0A1A8 2021     (01229)          HOP *L+1+                    NO, HOP TO EVEN LOC AFTE
               (01230) ;                                     R RET
0A1A9 0800     (01231)          EVEN
0A1AA CC000580 (01232)          MOVZM APDFLGS
0A1AC E1109E0C (01233)          STORE R1,R1SAV
0A1AE E1209E0E (01234)          STORE R2,R2SAV
0A1B0 E1309E10 (01235)          STORE R3,R3SAV
0A1B2 E1409E12 (01236)          STORE R4,R4SAV
0A1B4 E1509E14 (01237)          STORE R5,R5SAV
0A1B6 E1609E16 (01238)          STORE R6,R6SAV
0A1B8 E1709E18 (01239)          STORE R7,R7SAV
0A1BA 0E70     (01240)          RET
0A1BB 0800     (01241)          EVEN
0A1BC A6109E0C (01242)          LOAD R1,R1SAV
0A1BE A6209E0E (01243)          LOAD R2,R2SAV
0A1C0 A6309E10 (01244)          LOAD R3,R3SAV
0A1C2 A6409E12 (01245)          LOAD R4,R4SAV
0A1C4 A6509E14 (01246)          LOAD R5,R5SAV
0A1C6 A6609E16 (01247)          LOAD R6,R6SAV
0A1C8 A6709E18 (01248)          LOAD R7,R7SAV
               (01249) *
0A1CA DA288A0F (01250)          SMBCL 2,QTDCIS(R4)           SKIP IF BIT 2 OF DCT(R4)
0A1CC D2048C0F (01251)          SMB 0,SENS(R2)
0A1CE 2641     (01252)          INCR R4,1
0A1CF 0800     (01253)          EVEN
0A1D0 2621     (01254)          INCR R2,1                    INCREMENT THE BUFFER POS
               (01255) ;                                     ITION COUNTER
0A1D1 0800     (01256)          EVEN
0A1D2 8C50A1A2 (01257)          LJP R5,DBIT2S1               CHECK IF R5 +VE
0A1D4 E0509CBE (01258)          MOVBR R5,FORFORS             RELOAD THE COUNTER WITH
               (01259) ;                                     44
0A1D6 F2209C86 (01260)          CMPHR R2,POST3S              IS R2 GREATER THAN POST
               (01261) ;                                     3
0A1D8 8C2F9E88 (01262)          XCT CLIPIS,LE                ADD 18 TO LOOP COUNTER I
               (01263) ;                                     F LESS THAN OR EQUAL
0A1DA 8000A1A2 (01264)          JMP DBIT2S1                  GO BACK TO DBIT2S1
               (01265) *
```

```
                              *
                              *
                              ;  SERIALIZATION FOR BIT 1
                                          EVEN
                              DBITIS      EVEN
0A1EC  DE0005E0                           SBBSE 0,APDNELS         HAS APDONE HAPPENED?
0A1EE  2021                               HOP  #L+3)              NO, HOP TO EVEN LOC AFTE
                              ;                                   R RET
0A1EF  0800                               EVEN
0A1F0  CC0005E0                           MOVZM APDNELS
0A1F2  E1109E0C                           STORE R1,R1SAV
0A1F4  E1209E0E                           STORE R2,R2SAV
0A1F6  E1309E10                           STORE R3,R3SAV
0A1F8  E1409E12                           STORE R4,R4SAV
0A1FA  E1509E14                           STORE R5,R5SAV
0A1FC  E1609E16                           STORE R6,R6SAV
0A1FE  E1709E18                           STORE R7,R7SAV
0A1F0  0E70                               RET
0A1F1  0800                               EVEN
0A1F2  A6109E0C                           LOAD R1,R1SAV
0A1F4  A6209E0E                           LOAD R2,R2SAV
0A1F6  A6309E10                           LOAD R3,R3SAV
0A1F8  A6409E12                           LOAD R4,R4SAV
0A1FA  A6509E14                           LOAD R5,R5SAV
0A1FC  A6609E16                           LOAD R6,R6SAV
0A1FE  A6709E18                           LOAD R7,R7SAV
0A200  F2209C89                           CMPMB R2,POST4S
0A202  8010A2E8                           JMP EPDSRS,EQ
0A204  F078800F                           MOVMB R7,IBITS(R4)      SAVE THE IBIT VALUE
0A206  0040                               CLR R4
0A207  0800                               EVEN
                              *
                              *
0A208  F278800F               DBITIS1     CMPMB R7,IBITS(R4)      COMPARE THE BIT ASSIGNME
                              ;                                   NT WITH THE MARK
0A20A  8020A242                           JMP DBIT0S,GT           GOTO SERIALIZATION ROUTI
                              ;                                   NE IF NOT EQUAL
0A20C  DE0005E0                           SBBSE 0,APDNELS         HAS APDONE HAPPENED?
0A20E  2021                               HOP  #L+3)              NO, HOP TO EVEN LOC AFTE
                              ;                                   R RET
0A20F  0800                               EVEN
0A210  CC0005E0                           MOVZM APDNELS
0A212  E1109E0C                           STORE R1,R1SAV
0A214  E1209E0E                           STORE R2,R2SAV
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0A216 E1409E10 (01310)          STORE R3,R3SAV
0A21A E140[illegible] (01311)          STORE R4,R4SAV
0A21A E1509E11 (01312)          STORE R5,R5SAV
0A21C E1609E16 (01313)          STORE R6,R6SAV
0A21E E1709E18 (01314)          STORE R7,R7SAV
0A220 0E70     (01315)          RET
0A221 0800     (01316)          EVEN
0A222 AE109E0C (01317)          LOAD R1,R1SAV
0A224 AE209E0E (01318)          LOAD R2,R2SAV
0A226 AE309E10 (01319)          LOAD R3,R3SAV
0A228 AE409E12 (01320)          LOAD R4,R4SAV
0A22A AE509E11 (01321)          LOAD R5,R5SAV
0A22C AE609E16 (01322)          LOAD R6,R6SAV
0A22E AE709E18 (01323)          LOAD R7,R7SAV
                (01324) *
0A230 DA1B6A0E (01325)          SKBCL 1,0[illegible]DCTS(R4)      SKIP IF BIT 1 OF DCT(R4)
0A232 E201BC0E (01326)          SOP 0,SEGS(R2)
0A234 2641     (01327)          INCR R4,1
0A235 0800     (01328)          EVEN
0A236 2621     (01329)          INCR R2,1                 INCREMENT THE BUFFER POS
                (01330) :                                 ITION COUNTER
0A237 0800     (01331)          EVEN
0A238 BC50A208 (01332)          DJP R5,DBIT1S1            CHECK IF R5 +VE
0A23A E0509CBE (01333)          MOVOE R5,FORFOBS          RELOAD THE COUNTER WITH
                (01334) :                                 44
0A23C E2209CBE (01335)          CMPMI R2,POS13S           IS R2 GREATER THAN POST
                (01336) :                                 3
0A23E 8320[illegible] (01337)          ACT CNIPIS,LE             ADD 1B TO R2 IF LESS THA
                (01338) :                                 N OR EQUAL TO
0A240 8000A208 (01339)          JSP DBIT1S1               GO BACK TO DBIT1S1
                (01340) *
                (01341) *
                (01342) :  SERIALIZATION OF BIT 0
                (01343)          EVEN
0A242 E2209C80 (01344) DBIT0S    CMPNE R2,POST4S           COMPARE R2 WITH THE FRAM
                (01345) :                                 E LENGTH
0A244 8010A2E8 (01346)          JPE ENDSRS,EQ             LEAVE IF THE ENTIRE FRAM
                (01347) :                                 E IS FINISHED
0A246 1E0005A0 (01348)          SKBSE 0,APDFELS           HAS APDONE HAPPENED?
0A248 2621     (01349)          HOP $L+3A                 NO, HOP TO EVEN LOC AFTE
                (01350) :                                 R RET
0A249 0800     (01351)          EVEN
0A24A CC0005A0 (01352)          MOVZP APDFELS
0A24C E1109E0C (01353)          STORE R1,R1SAV
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0A24E F1209E0E (01354)          STORE R2,R2SAV
0A250 F1309E10 (01355)          STORE R3,R3SAV
0A252 F1409E12 (01356)          STORE R4,R4SAV
0A254 F1509E14 (01357)          STORE R5,R5SAV
0A256 F1609E16 (01358)          STORE R6,R6SAV
0A258 F1709E18 (01359)          STORE R7,R7SAV
0A25A 0E70     (01360)          RET
0A25B 0800     (01361)          EVEN
0A25C A6109E0C (01362)          LOAD R1,R1SAV
0A25E A6209E0E (01363)          LOAD R2,R2SAV
0A260 A6309E10 (01364)          LOAD R3,R3SAV
0A262 A6409E12 (01365)          LOAD R4,R4SAV
0A264 A6509E14 (01366)          LOAD R5,R5SAV
0A266 A6609E16 (01367)          LOAD R6,R6SAV
0A268 A6709E18 (01368)          LOAD R7,R7SAV
0A26A F2209CA6 (01369)          CMPMR R2,POST3$         COMPARE R2 WITH POST3
0A26C 8620A2B2 (01370)          JMP ERITOS,GT           IF GREATER THAN POST3, N
               (01371) ;                                O NEED TO PUT IN PARITY
               (01372) ;                                BITS
               (01373) *
               (01374) *
0A26E F0609C80 (01375)          MOVMR R6,POST4$         MOVE THE FRAME LENGTH TO
0A270 4E61     (01376)          SUBLR R6,R2             R6=LSEN-1-R2
0A271 0800     (01377)          EVEN
0A272 9040B20D (01378)          MOVIR R4,OTDCTS-1       MOVE ADDRESS OTDCT-1 TO
               (01379) ;                                R4
0A274 9C20BC0E (01380)          ADDIR R2,SENS           SET R2 TO BE THE ADDRESS
               (01381) ;                                :SEN1$(R2)
0A276 F0309C90 (01382)          MOVMR R3,ONES           SAVE THE MASK IN R3
0A278 3042     (01383) BRITOS1  POPXI R4,R1             POP OTDCT(R4)-->R1...R4=
               (01384) ;                                R4+1
0A279 0800     (01385)          EVEN
0A27A 4A16     (01386)          ANDLR R1,R3             SAVE ONLY THE LAST BIT
0A27B 0800     (01387)          EVEN
0A27C 3422     (01388)          PUSHXI R2,R1            SAVE THE VALUE IN SENS(R
               (01389) ;                                2).. R2=R2+1
0A27D 0800     (01390)          EVEN
0A27E DE000580 (01391)          SKRGL 0,APDNFLS         HAS APDONE HAPPENED?
0A280 2021     (01392)          HOP $L+3A               NO, HOP TO EVEN LOC AFTE
               (01393) ;                                R RET
0A281 0800     (01394)          EVEN
0A282 CC0005E0 (01395)          MOVZM APDNFLS
0A284 F1109E0C (01396)          STORE R1,R1SAV
0A286 F1209E0E (01397)          STORE R2,R2SAV
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0A288 E1309E10 (01398)          STORE R3,R3SAV
0A28A E1409E12 (01399)          STORE R4,R4SAV
0A28C E1509E14 (01400)          STORE R5,R5SAV
0A28E E1609E16 (01401)          STORE R6,R6SAV
0A290 E1709E18 (01402)          STORE R7,R7SAV
0A292 CE70     (01403)          RET
0A293 0800     (01404)          EVEN
0A294 AE109E0C (01405)          LOAD R1,R1SAV
0A296 AE209E0E (01406)          LOAD R2,R2SAV
0A298 AE309E10 (01407)          LOAD R3,R3SAV
0A29A AE409E12 (01408)          LOAD R4,R4SAV
0A29C AE509E14 (01409)          LOAD R5,R5SAV
0A29E AE609E16 (01410)          LOAD R6,R6SAV
0A2A0 AE709E18 (01411)          LOAD R7,R7SAV
               (01412) *
0A2A2 8C50A2AE (01413)          DJP R5,ENDS0               CHECK IF R5 +VE
0A2A4 E0509CEE (01414)          MOVMR R5,FOREORS           RELOAD THE COUNTER WITH
               (01415) ;                                   44
0A2A6 F2209C67 (01416)          CMPMR R2,POST3$1           IS R2 GREATER THAN POST
               (01417) ;                                   3
0A2A8 8020A2AE (01418)          JMP ENDS0,GT               JUMP TO ENDS0 IF GREATER
0A2AA EC209CEE (01419)          ADDMR R2,EIGTENS           ADD 18 TO R2
0A2AC EE609CEE (01420)          SUBMR R6,EIGTENS           SUBTRACT 18 FROM R6
0A2AE 8C60A27E (01421) ENDS0    DJP R6,DRIT0S1             LOOP BACK UNITIL THE ENT
               (01422) ;                                   IRE FRAME IS DONE
0A2B0 8000A2E4 (01423)          JMP ENDSRS
               (01424) *
               (01425) *
               (01426) ;  BIT SERIALIZATION WITHOUT ERROR CONTROL
               (01427) *
0A2B2 E0609C85 (01428) ERIT0S   MOVMR R6,POS14S            MOVE THE FRAME LENGTH TO
0A2B4 1E64     (01429)          SUBRR R6,R2                R6=LSFN-1-R2
0A2B5 0800     (01430)          EVEN
0A2B6 9040B200 (01431)          MOVIR R4,OTDCTS-1          MOVE ADDRESS QTDCT-1 TO
               (01432) ;                                   R4
0A2B8 9C20BC0E (01433)          ADDIR R2,SENS              SET R2 TO BE THE ADDRESS
               (01434) ;                                   :SEN1S(R2)
0A2BA E0309C9C (01435)          MOVMR R3,0GES              SAVE THE MASK IN R3
0A2BC 3042     (01436) ERIT0S1  POPXI R4,R1                POP QTDCT(R4)-->R1...R4=
               (01437) ;                                   R4+1
0A2BD 0400     (01438)          EVEN
0A2BE DE000540 (01439)          S9ÖSI 0,APDONES            HAS APDONS HAPPENED?
0A2C0 2621     (01440)          HOP #L434                  NO, HOP TO EVEN LOC AFTE
               (01441) ;                                   R RET
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0A2C1 0800        (01442)          EVEN
0A2C2 CC000550    (01443)          MOVZM APDRELS
0A2C3 F1109E0C    (01444)          STORE R1,R1SAV
0A2C6 F1209E0E    (01445)          STORE R2,R2SAV
0A2C8 F1309E10    (01446)          STORE R3,R3SAV
0A2CA F1409E12    (01447)          STORE R4,R4SAV
0A2CC F1509E14    (01448)          STORE R5,R5SAV
0A2CE F1609E16    (01449)          STORE R6,R6SAV
0A2D0 F1709E18    (01450)          STORE R7,R7SAV
0A2D2 0E70        (01451)          RET
0A2D3 0800        (01452)          EVEN
0A2D4 A6109E0C    (01453)          LOAD R1,R1SAV
0A2D6 A6209E0E    (01454)          LOAD R2,R2SAV
0A2D8 A6309E10    (01455)          LOAD R3,R3SAV
0A2DA A6409E12    (01456)          LOAD R4,R4SAV
0A2DC A6509E14    (01457)          LOAD R5,R5SAV
0A2DE A6609E16    (01458)          LOAD R6,R6SAV
0A2E0 A6709E18    (01459)          LOAD R7,R7SAV
0A2E2 4A16        (01460)          ANDRR R1,R3                         SAVE ONLY THE LAST BIT
0A2E3 0800        (01461)          EVEN
0A2E4 3422        (01462)          PUSHXI R2,R1                        SAVE THE VALUE IN SENS(R
                  (01463) ;                                            2).. R2=R2+1
0A2E5 0800        (01464)          EVEN
0A2E6 BC60A2BC    (01465)          DJP R6,FBIT0S1                      LOOP BACK UNITIL THE ENT
                  (01466) ;                                            IRE FRAME IS DONE
                  (01467) ENDSRS   EVEN
0A2E8 0280        (01468)          CCS 3                               FROM SRB=2...
0A2E9 06A0        (01469)          SCS 2                               TO SRB=1
0A2EA 02E0        (01470)          CCS 5                               FROM MRB=2...
0A2EB 06C0        (01471)          SCS 4                               TO MRB=1
                  (01472) *  JMP LODATS      NOT ENOUGH TIME TO PROTECT
0A2EC B000A2FF    (01473)          JMP RCHEOS                          PROTECT SIDEBAND
                  (01474)          EJECT
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                    (01475) ***** BCH ENCODING OF SIDEBAND & PART OF MAINBAND DATA
                    (01476) BCHE0S  EVEN
0A2FE 60200001      (01477)         MOVIR R2,1                          SET INPUT BUFFER POINTER
                    (01478) BCHE1S  EVEN
0A2E0 CE000580      (01479)         SSESE 0,APDNEGS                     HAS APDONE HAPPENED?
0A2E2 2021          (01480)         HOP #1434                           NO, HOP TO EVEN LOC AFTE
                    (01481) ;                                           R RET
0A2E3 0800          (01482)         EVEN
0A2E4 CC000580      (01483)         MOVZE APDNEGS
0A2E6 E1109E0C      (01484)         STORE R1,R1SAV
0A2E8 E1209E0E      (01485)         STORE R2,R2SAV
0A2EA E1309E10      (01486)         STORE R3,R3SAV
0A2EC E1409E12      (01487)         STORE R4,R4SAV
0A2EE E1509E14      (01488)         STORE R5,R5SAV
0A300 E1609E16      (01489)         STORE R6,R6SAV
0A302 E1709E18      (01490)         STORE R7,R7SAV
0A304 0E70          (01491)         RET
0A305 0800          (01492)         EVEN
0A306 A6109E0C      (01493)         LOAD R1,R1SAV
0A308 A6209E0E      (01494)         LOAD R2,R2SAV
0A30A A6309E10      (01495)         LOAD R3,R3SAV
0A30C A6409E12      (01496)         LOAD R4,R4SAV
0A30E A6509E14      (01497)         LOAD R5,R5SAV
0A310 A6609E16      (01498)         LOAD R6,R6SAV
0A312 A6709E18      (01499)         LOAD R7,R7SAV
0A314 0040          (01500)         CLR R3                              CLEAR 15 BITS REMAINDER
0A315 0040          (01501)         CLR R4                              CLEAR BITS 16,17,18
0A316 9050005B      (01502)         MOVIR R5,88                         R5=88
0A318 F2048C0E      (01503) BCHE2S  CMPMZ SENS(R2)                      READ SEN1S(R2)
0A31A 8010A320      (01504)         JMP BCHE3S,EQ                       GO TO BCHE3S IF SENS(R2)
                    (01505) ;                                           =0
0A31C C06A9CA2      (01506)         MOVPRL R6,TBENCS(R5)                R6=TBENC(R5),R7=TBENC(R5
                    (01507) ;                                           +1)
0A31E 443C          (01508)         XORRR R3,R6                         R3=R3.XOR.R6
0A31F 444F          (01509)         XORRR R4,R7                         R4=R4.XOR.R7
0A320 2621          (01510) BCHE3S  INCR R2,1                           INCREAMENT INPUT BUFFER
                    (01511) ;                                           POINTER
0A321 0800          (01512)         EVEN
0A322 8E50A318      (01513)         DEJP R5,BCHE2S                      DECREAMENT TABLE POINTER
                    (01514) *
                    (01515) ;  START SERIALIZE R3 AND R4
                    (01516) ;
                    (01517) ;
0A323 90500001      (01518)         MOVIR R5,1
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0A326 2866     (01519)          SRRCL 14,R3
0A327 F054BC0E (01520)          MOVRM R5,SENS(R2)
0A329 2856     (01521)          SRRCL 13,R3
0A32A F054BC0F (01522)          MOVRM R5,SENS+1(R2)
0A32C 2846     (01523)          SRRCL 12,R3
0A32D F054BC10 (01524)          MOVRM R5,SENS+2(R2)
0A32F 2836     (01525)          SRRCL 11,R3
0A330 F054BC11 (01526)          MOVRM R5,SENS+3(R2)
0A332 2826     (01527)          SRRCL 10,R3
0A333 F054BC12 (01528)          MOVRM R5,SENS+4(R2)
0A335 2816     (01529)          SRRCL 9,R3
0A336 F054BC13 (01530)          MOVRM R5,SENS+5(R2)
0A338 2806     (01531)          SRRCL 8,R3
0A339 F054BC14 (01532)          MOVRM R5,SENS+6(R2)
0A33B 2A76     (01533)          SRRCL 7,R3
0A33C F054BC15 (01534)          MOVRM R5,SENS+7(R2)
0A33E 2A66     (01535)          SRRCL 6,R3
0A33F F054BC16 (01536)          MOVRM R5,SENS+8(R2)
0A341 2A56     (01537)          SRRCL 5,R3
0A342 F054BC17 (01538)          MOVRM R5,SENS+9(R2)
0A344 2A46     (01539)          SRRCL 4,R3
0A345 F054BC18 (01540)          MOVRM R5,SENS+10(R2)
0A347 2A36     (01541)          SRRCL 3,R3
0A348 F054BC19 (01542)          MOVRM R5,SENS+11(R2)
0A34A 2A26     (01543)          SRRCL 2,R3
0A34B F054BC1A (01544)          MOVRM R5,SENS+12(R2)
0A34D 2A16     (01545)          SRRCL 1,R3
0A34E F054BC1B (01546)          MOVRM R5,SENS+13(R2)
0A350 2A96     (01547)          SRRCL 0,R3
0A351 F054BC1C (01548)          MOVRM R5,SENS+14(R2)
0A353 2A28     (01549)          SRRCL 2,R4
0A354 F054BC1D (01550)          MOVRM R5,SENS+15(R2)
0A356 2A18     (01551)          SRRCL 1,R4
0A357 F054BC1E (01552)          MOVRM R5,SENS+16(R2)
0A359 2A08     (01553)          SRRCL 0,R4
0A35A F054BC1F (01554)          MOVRM R5,SENS+17(R2)
               (01555) *  ADDIR R2,18
               (01556) *  CMPIR R2,190
               (01557) *  JMP ENDECS,EQ
               (01558) *  CMPIR R2,560
               (01559) *  JMP BCHEIS,LT
               (01560) *
               (01561) *
               (01562) ;  END OF ENCODER ROUTINE
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```
                  (01563) *
                  (01564) *
                  (01565) ENDECS  EVEN
0A35C 8000A35E    (01566)         JMP LODATS
                  (01567) *
                  (01568) *
                  (01569)         EJECT
```

```
                   ***** LOAD DIGITAL FRAME DATA INTO SEN1 OR SEN2
                   LODATS  EVEN
0A35E 0280                 CCS 3                              FROM SRB=2...
0A35F 06A0                 SCS 2                              TO SRB=1
0A360 02C0                 CCS 4                              FROM MRB=1...
0A361 06E0                 SCS 5                              TO MPB=2
0A362 DE000580             SMBSL 0,APDNFLS                    HAS APDONE HAPPENED?
0A363 2021                 HOP #L+34                          NO, HOP TO EVEN LOC AFTE
                   :                                          R RET
0A365 0800                 EVEN
0A366 CC000580             MOVZM APDNFLS
0A368 E1109E0C             STORE R1,R1SAV
0A36A E1209E0E             STORE R2,R2SAV
0A36C E1309E10             STORE R3,R3SAV
0A36E E1409E12             STORE R4,R4SAV
0A370 E1509E14             STORE R5,R5SAV
0A372 E1609E16             STORE R6,R6SAV
0A374 E1709E18             STORE R7,R7SAV
0A376 0E70                 RET
0A377 0800                 EVEN
0A378 A6109E0C             LOAD R1,R1SAV
0A37A A6209E0E             LOAD R2,R2SAV
0A37C A6309E10             LOAD R3,R3SAV
0A37E A6409E12             LOAD R4,R4SAV
0A380 A6509E14             LOAD R5,R5SAV
0A382 A6609E16             LOAD R6,R6SAV
0A384 A6709E18             LOAD R7,R7SAV
0A386 E0200567             MOVER R2,AFLGS                     'STORE AFLG TEMP. IN R2
0A388 E220056E             CMPRR R2,XDATAS                    'COMPARE R2 WITH XDATA
                   *!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
                   *  THIS ERROR TRAP MAY NEEDED,DELETED FOR DEBUG 5/17/80
                   *  JMP ERR2S,EQ     'ERROR OCCURS SINCE THE SAME BUF IS USED TWICE
                   *!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
0A38A E020056E             MOVRM R2,XDATAS                    'RESET XDATA
0A38C 90208C0C             MOVIR R2,SENS-2
0A38E 9040003D             MOVIR R4,LSEN1-1
0A390 F2000567             CMPMZ AFLGS                        WHICH BUFFER SHOULD THE
                   :                                          SERIALIZED DATA GO?
0A392 8010A414             JMP EL9S,EQ                        IF AFLG=0, LOAD SEN 1
                   *
0A394 E8028C0E             MOVLM 1,SENS                       MAKE SYNC BIT 1 FOR BUFF
                   :                                          ER 2
0A396 D7281636             BMOVEL R2,R4,SEN2S
0A398 DE000580             SMBSL 0,APDNFLS                    HAS APDONE HAPPENED?
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```
0A39A 2021      (01614)          HOP #L+34                    NO, HOP TO EVEN LOC AFTE
                (01615) *                                     R RET
0A39B 0800      (01616)          EVEN
0A39C CC0005B0  (01617)          MOVZM APDNFLS
0A39E F1109F0C  (01618)          STORE R1,R1SAV
0A3A0 F1209F0E  (01619)          STORE R2,R2SAV
0A3A2 F1309F10  (01620)          STORE R3,R3SAV
0A3A4 F1409F12  (01621)          STORE R4,R4SAV
0A3A6 F1509F14  (01622)          STORE R5,R5SAV
0A3A8 F1609F16  (01623)          STORE R6,R6SAV
0A3AA F1709F18  (01624)          STORE R7,R7SAV
0A3AC 0F70      (01625)          RET
0A3AD 0800      (01626)          EVEN
0A3AE A6109F0C  (01627)          LOAD R1,R1SAV
0A3B0 A6209F0E  (01628)          LOAD R2,R2SAV
0A3B2 A6309F10  (01629)          LOAD R3,R3SAV
0A3B4 A6409F12  (01630)          LOAD R4,R4SAV
0A3B6 A6509F14  (01631)          LOAD R5,R5SAV
0A3B8 A6609F16  (01632)          LOAD R6,R6SAV
0A3BA A6709F18  (01633)          LOAD R7,R7SAV
0A3BC 90208C8B  (01634)          MOVIR R2,SENS-2+LSEN12
0A3BE 9040003D  (01635)          MOVIR R4,LSEN1-1
0A3C0 E72816CA  (01636)          BMOVEL R2,R4,SEN2$+LSEN12
                (01637) *  MOVLW CLRSG2,SYSFLGS
0A3C2 DE0005B0  (01638)          SMBSL 0,APDNFLS              HAS APDONE HAPPENED?
0A3C4 2021      (01639)          HOP #L+34                    NO, HOP TO EVEN LOC AFTE
                (01640) *                                     R RET
0A3C5 0800      (01641)          EVEN
0A3C6 CC0005B0  (01642)          MOVZM APDNFLS
0A3C8 F1109F0C  (01643)          STORE R1,R1SAV
0A3CA F1209F0E  (01644)          STORE R2,R2SAV
0A3CC F1309F10  (01645)          STORE R3,R3SAV
0A3CE F1409F12  (01646)          STORE R4,R4SAV
0A3D0 F1509F14  (01647)          STORE R5,R5SAV
0A3D2 F1609F16  (01648)          STORE R6,R6SAV
0A3D4 F1709F18  (01649)          STORE R7,R7SAV
0A3D6 0F70      (01650)          RET
0A3D7 0800      (01651)          EVEN
0A3D8 A6109F0C  (01652)          LOAD R1,R1SAV
0A3DA A6209F0E  (01653)          LOAD R2,R2SAV
0A3DC A6309F10  (01654)          LOAD R3,R3SAV
0A3DE A6409F12  (01655)          LOAD R4,R4SAV
0A3E0 A6509F14  (01656)          LOAD R5,R5SAV
0A3E2 A6609F16  (01657)          LOAD R6,R6SAV
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0A3E4 A6709E18 (01658)          LOAD R7,R7SAV
0A3E6 90208E04 (01659)          MOVIR R2,SENS-2+2*LSEN12
0A3E8 9040003C (01660)          MOVIR R4,LSEN1-2
0A3EA D72B1746 (01661)          RMOVEL R2,R4,SEN2S+2*LSEN12
0A3EC DE000580 (01662)          SMESL 0,APDNELS                     HAS APDONE HAPPENED?
0A3EE 2021     (01663)          HOP #L+34                           NO, HOP TO EVEN LOC AFTE
               (01664) ;                                            R RET
0A3EF 0800     (01665)          EVEN
0A3F0 CC000580 (01666)          MOVZM APDNELS
0A3F2 E1109E0C (01667)          STORE R1,R1SAV
0A3F4 E1209E0E (01668)          STORE R2,R2SAV
0A3F6 E1309E10 (01669)          STORE R3,R3SAV
0A3F8 E1409E12 (01670)          STORE R4,R4SAV
0A3FA E1509E14 (01671)          STORE R5,R5SAV
0A3FC E1609E16 (01672)          STORE R6,R6SAV
0A3FE E1709E18 (01673)          STORE R7,R7SAV
0A400 0E70     (01674)          RET
0A401 0800     (01675)          EVEN
0A402 A6109E0C (01676)          LOAD R1,R1SAV
0A403 A6209E0E (01677)          LOAD R2,R2SAV
0A406 A6309E10 (01678)          LOAD R3,R3SAV
0A408 A6409E12 (01679)          LOAD R4,R4SAV
0A40A A6509E14 (01680)          LOAD R5,R5SAV
0A40C A6609E16 (01681)          LOAD R6,R6SAV
0A40E A6709E18 (01682)          LOAD R7,R7SAV
0A410 E0200567 (01683)          MOVMR R2,AFLGS                      'STORE AFLG TEMP. IN R2
0A412 B000A490 (01684)          JMP XMITSE                          END OF "TRANSMITTER"
0A414 CC008C0E (01685) FL9$     MOVZM SENS                          MAKE SYNC BIT 0 FOR BUFF
               (01686) ;                                            ER 1
0A416 D72B140C (01687)          RMOVEL R2,R4,SEN1S
0A418 DE000580 (01688)          SMBSL 0,APDNELS                     HAS APDONE HAPPENED?
0A41A 2021     (01689)          HOP #L+34                           NO, HOP TO EVEN LOC AFTE
               (01690) ;                                            R RET
0A41B 0800     (01691)          EVEN
0A41C CC000580 (01692)          MOVZM APDNELS
0A41E E1109E0C (01693)          STORE R1,R1SAV
0A420 E1209E0E (01694)          STORE R2,R2SAV
0A422 E1309E10 (01695)          STORE R3,R3SAV
0A424 E1409E12 (01696)          STORE R4,R4SAV
0A426 E1509E14 (01697)          STORE R5,R5SAV
0A428 E1609E16 (01698)          STORE R6,R6SAV
0A42A E1709E18 (01699)          STORE R7,R7SAV
0A42C 0E70     (01700)          RET
0A42D 0800     (01701)          EVEN
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0A42E A6109F0C (01702)          LOAD R1,R1SAV
0A430 A6209F0E (01703)          LOAD R2,R2SAV
0A432 A6309F10 (01704)          LOAD R3,R3SAV
0A434 A6409F12 (01705)          LOAD R4,R4SAV
0A436 A6509F14 (01706)          LOAD R5,R5SAV
0A438 A6609F16 (01707)          LOAD R6,R6SAV
0A43A A6709F18 (01708)          LOAD R7,R7SAV
0A43C 90208C88 (01709)          MOVIR R2,SENS-2+LSEN12
0A43E 9040003B (01710)          MOVIR R4,LSEN1-1
0A440 D72E1558 (01711)          BMOVEL R2,R4,SEN1S+LSEN12
0A442 DE000580 (01712)          SMBSL 0,APDNELS                  HAS APDONE HAPPENED?
0A444 2021     (01713)          HOP #L+34                        NO, HOP TO EVEN LOC AFTE
               (01714) ;                                         R RET
0A445 0800     (01715)          EVEN
0A446 CC000580 (01716)          MOVZM APDNELS
0A448 E1109F0C (01717)          STORE R1,R1SAV
0A44A E1209F0E (01718)          STORE R2,R2SAV
0A44C E1309F10 (01719)          STORE R3,R3SAV
0A44E E1409F12 (01720)          STORE R4,R4SAV
0A450 E1509F14 (01721)          STORE R5,R5SAV
0A452 E1609F16 (01722)          STORE R6,R6SAV
0A454 E1709F18 (01723)          STORE R7,R7SAV
0A456 0E70     (01724)          RET
0A457 0800     (01725)          EVEN
0A458 A6109F0C (01726)          LOAD R1,R1SAV
0A45A A6209F0E (01727)          LOAD R2,R2SAV
0A45C A6309F10 (01728)          LOAD R3,R3SAV
0A45E A6409F12 (01729)          LOAD R4,R4SAV
0A460 A6509F14 (01730)          LOAD R5,R5SAV
0A462 A6609F16 (01731)          LOAD R6,R6SAV
0A464 A6709F18 (01732)          LOAD R7,R7SAV
0A466 90208D04 (01733)          MOVIR R2,SENS-2+2*LSEN12
0A468 9040003C (01734)          MOVIR R4,LSEN1-2
0A46A D72815D4 (01735)          BMOVEL R2,R4,SEN1S+2*LSEN12
0A46C DE000580 (01736)          SMBSL 0,APDNELS                  HAS APDONE HAPPENED?
0A46E 2021     (01737)          HOP #L+34                        NO, HOP TO EVEN LOC AFTE
               (01738) ;                                         R RET
0A46F 0800     (01739)          EVEN
0A470 CC000580 (01740)          MOVZM APDNELS
0A472 E1109F0C (01741)          STORE R1,R1SAV
0A474 E1209F0E (01742)          STORE R2,R2SAV
0A476 E1309F10 (01743)          STORE R3,R3SAV
0A478 E1409F12 (01744)          STORE R4,R4SAV
0A47A E1509F14 (01745)          STORE R5,R5SAV
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0A47C F1609F16 (01746)          STORE R6,R6SAV
0A47E F1709F18 (01747)          STORE R7,R7SAV
0A480 0E70     (01748)          RET
0A481 0800     (01749)          EVEN
0A482 A6109F0C (01750)          LOAD R1,R1SAV
0A484 A6209F0E (01751)          LOAD R2,R2SAV
0A486 A6309F10 (01752)          LOAD R3,R3SAV
0A488 A6409F12 (01753)          LOAD R4,R4SAV
0A48A A6509F14 (01754)          LOAD R5,R5SAV
0A48C A6609F16 (01755)          LOAD R6,R6SAV
0A48E A6709F18 (01756)          LOAD R7,R7SAV
0A490 2000     (01757) XMITSF   NOP                  *** FOR DEBUG ONLY ***
0A491 0200     (01758)          CCS 5                FROM MRB=2...
0A492 0EC0     (01759)          SCS 4                TO MRB=1
0A493 80009F30 (01760)          JMP TRANSRA          RETURN TO XMIT UPON THE
               (01761) ;                             NEXT G3 INTERRUPT
               (01762)          EJECT
```

```
                    (01763) *
                    (01764) *
                    (01765) ;
                    (01766) ;
                    (01767) ;++++++++++++++++++++++++++++++++++++++++
                    (01768) ;
                    (01769) ; MODULE XRECV.TXT: SET UP RECEIVER
                    (01770) ;
                    (01771) ;++++++++++++++++++++++++++++++++++++++++
                    (01772) ;
0A495 0800          (01773)          EVEN
0A496 CC000574      (01774) XRECVS   MOVZB,PGO                      CLEAR RCVR GO FLG
0A49B EE020581      (01775)          MOVEB HS,RCVOFF                TELL "TIMER" FL THAT CSP
                    (01776) ;                                       U RCVR CODE IS ON
                    (01777) *  MOVEB SETSG2,SYSFLGS
0A49A EE02056B      (01778)          MOVEB 1,SYNS                   RESET THE SYNTHESIZER RE
                    (01779) ;                                       ADY FLAG
                    (01780)          EJECT
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0A49C EA19FFCF (01781) MOVESR  MOVEP SETSGO,SYSFLGS
0A49E 02A0     (01782)         CCS 2                              FROM SRB=1...
0A49F 06B0     (01783)         SCS 3                              TO SRB=2
0A4A0 0200     (01784)         CCS 5                              FROM MRB=2...
0A4A1 06C0     (01785)         SCS 4                              TO MRB=1
0A4A2 E0200569 (01786)         MOVBR R2,SFLGS                     'STORE TEMP. SFLG IN R2
0A4A4 F220056F (01787)         CMPMR R2,RDATAS                    COMPARE IT WITH RDATA
               (01788) *!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
               (01789) *  THIS ERROR TRAP MAY NEEDED,DELETED FOR DEBUG 5/17/80
               (01790) *  JMP EEE4S,EQ     GOTO ERROR ROUTINE IF RDATA=SFLG
               (01791) *!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
0A4A6 E020056F (01792)         MOVRM R2,RDATAS                    STORE R2 IN SFLG
               (01793) ;
               (01794) ;
0A4A8 9040003C (01795)         MOVIR R4,LSEN2-1
0A4AA E200056F (01796)         CMPMZ RDATAS                       IS SFLG =0?
0A4AC 8010A530 (01797)         JMP EL11S,EQ                       UNLOAD BUF1 IF SFLG=0
               (01798) ;
0A4AE 9020136B (01799)         MOVIR R2,RECV2S-1                  SET UP TO UNLOAD RECV2
0A4B0 C820BFF1 (01800)         EOPMI R2,RF2S                      'MOVE 1ST HALF-WORD, ODD
0A4B2 2721     (01801)         DECR R2,1                          'SET UP FOR BMOVE
0A4B3 0800     (01802)         EVEN
0A4B4 E728BFF2 (01803)         BMOVEL R2,R4,RF2S+1                'START EVEN
0A4B6 DE000580 (01804)         SMBSL 0,APDNFLS                    HAS APDONE HAPPENED?
0A4B8 2021     (01805)         HOF *L+34                          NO, HOP TO EVEN LOC AFTE
               (01806) ;                                          R RET
0A4B9 0800     (01807)         EVEN
0A4BA CC000580 (01808)         MOVZM APDNFLS
0A4BC F1109F0C (01809)         STORE R1,R1SAV
0A4BE F1209F0E (01810)         STORE R2,R2SAV
0A4C0 F1309F10 (01811)         STORE R3,R3SAV
0A4C2 F1409F12 (01812)         STORE R4,R4SAV
0A4C4 F1509F14 (01813)         STORE R5,R5SAV
0A4C6 F1609F16 (01814)         STORE R6,R6SAV
0A4C8 F1709F18 (01815)         STORE R7,R7SAV
0A4CA 0E70     (01816)         RET
0A4CB 0800     (01817)         EVEN
0A4CC A6109F0C (01818)         LOAD R1,R1SAV
0A4CE A6209F0E (01819)         LOAD R2,R2SAV
0A4D0 A6309F10 (01820)         LOAD R3,R3SAV
0A4D2 A6409F12 (01821)         LOAD R4,R4SAV
0A4D4 A6509F14 (01822)         LOAD R5,R5SAV
0A4D6 A6609F16 (01823)         LOAD R6,R6SAV
0A4D8 A6709F18 (01824)         LOAD R7,R7SAV
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0A4DA 90261AE2 (01825)          MOVIR R2,RECV2S-1+LSEN22
0A4DC 9C40003C (01826)          MOVIR R4,LSEN2-1
0A4DE B7289060 (01827)          RMOVEL R2,R4,RE2S+LSEN22+1
0A4E0 0E000580 (01828)          SMBSL 0,APDNFLS                 HAS APDONE HAPPENED?
0A4E2 2021     (01829)          HOP #L+34                       NO, HOP TO EVEN LOC AFTE
               (01830) ;                                        R RET
0A4E4 0800     (01831)          EVEN
0A4E4 CC000580 (01832)          MOVZM APDNFLS
0A4E6 E1109E0C (01833)          STORE R1,R1SAV
0A4E8 E1209E0E (01834)          STORE R2,R2SAV
0A4EA E1309E10 (01835)          STORE R3,R3SAV
0A4EC E1409E12 (01836)          STORE R4,R4SAV
0A4EE E1509E14 (01837)          STORE R5,R5SAV
0A4F0 E1609E16 (01838)          STORE R6,R6SAV
0A4F2 E1709E18 (01839)          STORE R7,R7SAV
0A4F4 0E70     (01840)          RET
0A4F5 0800     (01841)          EVEN
0A4F6 A6109E0C (01842)          LOAD R1,R1SAV
0A4F8 A6209E0E (01843)          LOAD R2,R2SAV
0A4FA A6309E10 (01844)          LOAD R3,R3SAV
0A4FC A6409E12 (01845)          LOAD R4,R4SAV
0A4FE A6509E14 (01846)          LOAD R5,R5SAV
0A500 A6609E16 (01847)          LOAD R6,R6SAV
0A502 A6709E18 (01848)          LOAD R7,R7SAV
0A504 9020145C (01849)          MOVIR R2,RECV2S-1+2*LSEN22
0A506 9040003C (01850)          MOVIR R4,LSEN2-1
0A508 B72890E6 (01851)          RMOVEL R2,R4,RE2S+2*LSEN22+1
0A50A 0E000580 (01852)          SMBSL 0,APDNFLS                 HAS APDONE HAPPENED?
0A50C 2021     (01853)          HOP #L+34                       NO, HOP TO EVEN LOC AFTE
               (01854) ;                                        R RET
0A50E 0800     (01855)          EVEN
0A50E CC000580 (01856)          MOVZM APDNFLS
0A510 E1109E0C (01857)          STORE R1,R1SAV
0A512 E1209E0E (01858)          STORE R2,R2SAV
0A514 E1309E10 (01859)          STORE R3,R3SAV
0A516 E1409E12 (01860)          STORE R4,R4SAV
0A518 E1509E14 (01861)          STORE R5,R5SAV
0A51A E1609E16 (01862)          STORE R6,R6SAV
0A51C E1709E18 (01863)          STORE R7,R7SAV
0A51E 0E70     (01864)          RET
0A51F 0800     (01865)          EVEN
0A520 A6109E0C (01866)          LOAD R1,R1SAV
0A522 A6209E0E (01867)          LOAD R2,R2SAV
0A524 A6309E10 (01868)          LOAD R3,R3SAV
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0A526 A6409E12 (01869)          LOAD R4,R4SAV
0A528 A6509E14 (01870)          LOAD R5,R5SAV
0A52A A6609E16 (01871)          LOAD R6,R6SAV
0A52C A6709E18 (01872)          LOAD R7,R7SAV
               (01873) ;
0A52E 8000A592 (01874)          JMP EL12S
               (01875) ;
               (01876) ;
0A530 90201EE6 (01877) EL11S    MOVIR R2,RECV1S-2                    SET UP TO UNLOAD RECV1
0A532 D728BE80 (01878)          BMOVEL R2,R4,BE1S
0A534 DE000580 (01879)          SMBSL 0,APDNELS                      HAS APDONE HAPPENED?
0A536 2005     (01880)          BOP #L+6
0A537 0800     (01881)          EVEN
0A538 CC000580 (01882)          MOVZM APDNELS
0A53A 0E70     (01883)          RET
0A53B 0800     (01884)          EVEN
0A53C 90201270 (01885)          MOVIR R2,RECV1S-2+LSEN22
0A53E 9040003C (01886)          MOVIR R4,LSEN2-1
0A540 D728BEEA (01887)          BMOVEL R2,R4,BE1S+LSEN22
0A542 DE000580 (01888)          SMBSL 0,APDNELS                      HAS APDONE HAPPENED?
0A544 2005     (01889)          BOP #L+6
0A545 0800     (01890)          EVEN
0A546 CC000580 (01891)          MOVZM APDNELS
0A548 0E70     (01892)          RET
0A549 0800     (01893)          EVEN
0A54A 902012EA (01894)          MOVIR R2,RECV1S-2+2*LSEN22
0A54C 9040003D (01895)          MOVIR R4,LSEN2
0A54E D728BE74 (01896)          BMOVEL R2,R4,BE1S+2*LSEN22
0A550 DE000580 (01897)          SMBSL 0,APDNELS                      HAS APDONE HAPPENED?
0A552 2005     (01898)          BOP #L+6
0A553 0800     (01899)          EVEN
0A554 CC000580 (01900)          MOVZM APDNELS
0A556 0E70     (01901)          RET
0A557 0800     (01902)          EVEN
0A558 90201365 (01903)          MOVIR R2,RECV1S-2+3*LSEN22+1
0A55A C820BEE0 (01904)          POPMI R2,BE1S+LSEN-1                 'MOVE LAST HALF WORD
0A55C 2721     (01905)          DECR R2,1
0A55D 0800     (01906)          EVEN
0A55E C82092D2 (01907)          POPMI R2,BE3S+LSEN-1                 'TO BOTH BUFFERS
0A560 DE000580 (01908)          SMBSL 0,APDNELS                      HAS APDONE HAPPENED?
0A562 2005     (01909)          BOP #L+6
0A563 0800     (01910)          EVEN
0A564 CC000580 (01911)          MOVZM APDNELS
0A566 0E70     (01912)          RET
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0A567 0800      (01913)        EVEN
0A568 90201176  (01914)        MOVIR R2,RECV1S-2                  ;MOVE SAME BLOCKS TO BUF
                (01915) ;                                         3
0A56A 9040003C  (01916)        MOVIR R4,LSEN2-1
0A56C L72891F2  (01917)        RMOVEL R2,R4,BF3S
0A56E DE000580  (01918)        SKBSL 0,APDNFLS                    HAS APDONE HAPPENED?
0A570 2005      (01919)        BOP #L+6
0A571 0800      (01920)        EVEN
0A572 CC000580  (01921)        MOVZM APDNFLS
0A574 0E70      (01922)        RET
0A575 0800      (01923)        EVEN
0A576 90201270  (01924)        MOVIR R2,RECV1S-2+LSEN22
0A578 9040003C  (01925)        MOVIR R4,LSEN2-1
0A57A D72891DC  (01926)        RMOVEL R2,R4,BF3S+LSEN22
0A57C EE000580  (01927)        SKBSL 0,APDNFLS                    HAS APDONE HAPPENED?
0A57E 2005      (01928)        BOP #L+6
0A57F 0800      (01929)        EVEN
0A580 CC000580  (01930)        MOVZM APDNFLS
0A582 0E70      (01931)        RET
0A583 0800      (01932)        EVEN
0A584 902012EA  (01933)        MOVIR R2,RECV1S-2+2*LSEN22
0A586 9040003D  (01934)        MOVIR R4,LSEN2
0A588 L7289256  (01935)        RMOVEL R2,R4,BF3S+2*LSEN22
0A58A DE000580  (01936)        SKBSL 0,APDNFLS                    HAS APDONE HAPPENED?
0A58C 2005      (01937)        BOP #L+6
0A58D 0800      (01938)        EVEN
0A58E CC000580  (01939)        MOVZM APDNFLS
0A590 0E70      (01940)        RET
0A591 0800      (01941)        EVEN
0A592 0280      (01942) FL12S  CCS 3                              FROM SRB=2...
0A593 06A0      (01943)        SCS 2                              TO SRB=1
                (01944) *SYNC CHECK AND UPDATE,SEARCH IF NECESSARY.
                (01945) ;   R1 - PTR TO THE RMODEM BUFFER BEING SEARCHED
                (01946)
                (01947) ;   R2 - OFFSET INTO THE RMODEM, RSSPF, RSSSS BUFFERS
                (01948) ;   R3 - SCRATCH AC
                (01949) ;   R4 - MAXCNT, THE MAX. OF RSSSS(I)
                (01950) ;   R5 - NMAX, THE # OF INSTANCES OF MAXCNT IN RSSSS(I)
                (01951) ;   R6 - IMAX, THE FRAME OFFSET WHERE MAXCNT WAS FOUND
                (01952) ; VARIABLES:
                (01953) ;   SYNCS - BEGINNING OF FRAME OFFSET TO THE SYNC WORD IN THE
                (01954) ;   RMODEM BUFFER
0A594 9010BFR0  (01955) SCHKS  MOVIR R1,RF1S                      PREPARE TO USE BF1 AS NE
                (01956) ;                                         W BUFFER
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0A596 F200056F (01957)         CMPMZ RDATAS                         CHECK ASSUMPTION
0A598 8010A59C (01958)         JMP SCHKIS,F0
0A59A 9010BFF1 (01959)         MOVIR R1,RF2S                        NON ZERO MEANS USE RF2
0A59C F2000578 (01960) SCHKIS  CMPMZ RSYN                           ;WHAT DO WE KNOW ABOUT S
               (01961) ;                                            YNC?
               (01962)         EVEN
0A59E 8610A5A4 (01963)         JMP RMISLS,EQZ                       ;0 MEANS NIL, SO INIT
0A5A0 8630A5AC (01964)         JMP RMISSR,LTZ                       ;-1 MEANS WE LACK IT, SO
0A5A2 8000A656 (01965)         JMP UNPEELS                          SYNCH OK, SO COPY BITS
      00000001 (01966)         IPMSRD=1
      00000004 (01967)         LSTHP=4
      0000000A (01968)         ACOTH=10
      00000171 (01969)         MBLTH=369
               (01970)         EVEN
0A5A4 9031FFFF (01971) RMISLS: MOVIR R3,-1
0A5A6 F0300578 (01972)         MOVRM R3,RSYN                        ;SAY WE'VE LOST IT
0A5A8 8610A5AF (01973) RMISSIN CALL R1,SYNIN
0A5AA 80009F66 (01974)         JMP RECVSRA
0A5AC 8000A5C4 (01975) RMISSP  JMP SYNSR
               (01976) ; SYNIN: INITIALIZE BUFFERS, ETC. FOR SYNC SEARCHING.  CALL WITH
               (01977) ;   R1 POINTING TO RMODEM BUFFER.
               (01978) ; ALSO ZEROS THE ENTIRE "LAST" RBITS BUFFER.
               (01979)          EVEN
0A5AF 90200170 (01980) SYNIN   MOVIR R2,MBLTH-1                     ;BUFFER OFFSET = LAST WO
               (01981) ;                                            RD IN BUFFER
0A5B0 4C14     (01982)         ADDRR R1,R2
0A5B1 70320001 (01983) SISLP   MOVWR R3,R1,1                        ;PICK UP DATA BIT (BIT 0
               (01984) ;                                            )
0A5B3 F0349935 (01985)         MOVRM R3,RSSPF(R2)                   ; AND STASH IT IN RSSPF(
               (01986) ;                                            I)
0A5B5 2711     (01987)         DECR R1,1
0A5B6 8C20A5B1 (01988)         DJP R2,SISLP
0A5B8 F0200578 (01989)         MOVRM R2,RSYN                        ;SET RSYN=-1 TO MEAN SEA
               (01990) ;                                            RCH FOR SYNC
0A5BA 964097C2 (01991) SISBMD  MOVIR R4,RSSSS-WS                    ;CLEAR THE RSSSS BUFFER
0A5BC C10097C4 (01992)         MOVZRL RSSSS
0A5BE 962000B8 (01993)         MOVIR R2,MBLTH/2
0A5C0 D74497C6 (01994)         RMOVEL R4,R2,RSSSS+WS
0A5C2 0F70     (01995)         RETURN
               (01996) ;
               (01997) ;
               (01998) ; SYNSR: SEARCH INCOMING RMODEM BUFFER FOR SYNC, AND IF SYNC
               (01999) ;   IS FOUND, SET RSYN TO +1 AND SET SYNCS TO THE FRAME OFFSET
               (02000) ;   CORRESPONDING TO THE LOGICAL START OF THE FRAME.
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                    (02001) ; CALL WITH R1 POINTING TO THE START OF THE RMODEM BUFFER TO BE
                    (02002) ;    SEARCHED.
                    (02003) ; REGISTER USAGE:
                    (02004) ; BUFFERS:
                    (02005) ;    RSSPF - SYNC-SEARCH PREVIOUS FRAME - STORES THE DATA BIT OF THE
                    (02006) ;   PREVIOUS RMODEM BUFFER
                    (02007) ;    RSSSS - SYNC-SEARCH SUM-OF-SYNC COUNTS - FOR EACH RMODEM WORD,
                    (02008) ;   STORES THE NUMBER OF CONSECUTIVE FRAMES OF DATA BIT
                    (02009) ;   ALTERNATION.
0A5C3 0800          (02010)               EVEN
0A5C4 90200170      (02011) SYNSR         MOVIR R2,MRLTH-1                        ;INIT BUFFER OFFSET TO L
                    (02012) ;                                                       AST IN FRAME
0A5C6 4C14          (02013)               ADDRR R1,R2                             ;MAKE R1 POINT THERE TOO
0A5C7 0D40          (02014)               CLR R4                                  ;MAXCNT <- 0
0A5C8 DE0005B0      (02015) SSSLP         SMBSL 0,APDNFLS                         HAS APDONE HAPPENED?
0A5CA 2021          (02016)               HOP *L+34                               NO, HOP TO EVEN LOC AFTE
                    (02017) ;                                                       R RET
0A5CB 0800          (02018)               EVEN
0A5CC CC0005B0      (02019)               MOVZM APDNFLS
0A5CE F1109F0C      (02020)               STORE R1,R1SAV
0A5D0 F1209F0E      (02021)               STORE R2,R2SAV
0A5D2 F1309F10      (02022)               STORE R3,R3SAV
0A5D4 F1409F12      (02023)               STORE R4,R4SAV
0A5D6 F1509F14      (02024)               STORE R5,R5SAV
0A5D8 F1609F16      (02025)               STORE R6,R6SAV
0A5DA F1709F18      (02026)               STORE R7,R7SAV
0A5DC 0F70          (02027)               RET
0A5DD 0800          (02028)               EVEN
0A5DE A6109F0C      (02029)               LOAD R1,R1SAV
0A5E0 A6209F0E      (02030)               LOAD R2,R2SAV
0A5E2 A6309F10      (02031)               LOAD R3,R3SAV
0A5E4 A6409F12      (02032)               LOAD R4,R4SAV
0A5E6 A6509F14      (02033)               LOAD R5,R5SAV
0A5E8 A6609F16      (02034)               LOAD R6,R6SAV
0A5EA A6709F18      (02035)               LOAD R7,R7SAV
0A5EC 70320001      (02036)               MOVAR R3,R1,ILWSRD                      ;R3 <- NEW DATA BIT (OTH
                    (02037) ;                                                       ER BITS MASKED)
0A5EE F2349945      (02038)               CMPRM R3,RSSPF(R2)                      ;DOES THIS BIT ALTERNATE
0A5F0 B010A662      (02039)               JMP SSSNAL,EQ                           ;JUMP IF NO ALTERNATION
0A5F2 F50497C4      (02040) SSSALT        INCM RSSSS(R2)                          ;YES: COUNT THE BIT ALTE
                    (02041) ;                                                       RNATION
0A5F4 F24497C4      (02042)               CMPRM R4,RSSSS(R2)                      ;IS MAXCNT >= RSSSS(I)?
0A5F6 B130A5FF      (02043)               JMP NOMAX,GE                            ;YES
0A5F8 F04497C4      (02044) NEWMAX        MOVMR R1,RSSSS(R2)                      ;NO: RSSSS(I) BECOMES TH
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                 ;                                              F NEW MAXCNT
0A5FA 96500001           MOVIR R5,1                             ;NMAX <- 1 (UNIQUE SO FA
                 ;                                              R)
0A5FC 4064               MOVRR R6,R2                            ;AND WE SAVE THE OFFSET
                 ;                                              IN IMAX
0A5FD 2006               BOP SSSLPT
                 ;
                         EVEN
0A5FE B110A604   NOMAX   JMP SSSLPT,NE                          ;MAXCNT = RSSSS(I)?
0A600 2651               INCR R5,1                              ;YES, SO THE MAX ISN'T U
                 ;                                              NIQUE
0A601 2002               BOP SSSLPT
                 ;
                         EVEN
0A602 CC0497C4   SSSMAL  MOVZR RSSSS(R2)                        ;CLEAR RSSSS(I)
0A603 F0349935   SSSLPT  MOVRM R3,RSSPF(R2)                     ;SAVE NEW DATA BIT IN RS
                 ;                                              SPF(I)
0A606 2711               DECR R1,1                              ;DECR RMODEM BUFFER PTR
0A607 0800               EVEN
0A608 8C20A5C8           DJP R2,SSSLP                           ;DECR OFFSET AND TEST IF
                 ; WE HAVE NOW SCANNED THE WHOLE BUFFER.  IS MAXCNT >= THE SYNC
                 ;   ACQUISITION THRESHOLD, AND IT IT A UNIQUE MAX?  IF SO, WE HAVE
                 ;   FOUND SYNC.
0A60A 9240000A           CMPIR R4,ACQTH                         ;MAXCNT >= ACQTH?
0A60C B030A62A           JMP SSSNO,LT                           ;NO
0A60E 92500001           CMPIR R5,1                             ;YES: IS NMAX=1?
0A610 B110A62A           JMP SSSNO,NE                           ;NO
0A612 F050057B           MOVRM R5,RSYN                          ;YES: WE HAVE SYNC. SET
                 ;                                              RSYN TO +1
0A614 F0600577           MOVRM R6,SYNCS                         ;SAVE OFFSET IN SYNCS
0A616 90300004           MOVIR R3,LSTHR
0A618 F030057C           MOVRM R3,ERSYN                         ;INIT ERSYN TO COUNT ERR
                 ;                                              ORS
0A61A 9031FFFC           MOVIR R3,-4
0A61C F0300579           MOVRM R3,NEWSYN                        SET # OF FRAMES TO WAIT
                 ;                                              BEFORE PUTTIN OUT SPEECH
0A61E F0509C84           MOVRM R5,FRSTF                         SET FIRST FRAME AFTER SY
                 ;                                              NC FLAG
0A620 CC00057B           MOVZR LSTER                            ; FOR SUPDAT NEXT FRAME
0A622 9C1C0001           ADDIR R1,1(R6)                         ;R1 POINTS TO WORD HOLDI
                 ;                                              NG SYNC
0A624 70320001           MOVWR R3,R1,IDWSRD                     ;PICK UP SYNC BIT AND SA
                 ;                                              VE IT IN
0A626 F030057A           MOVRM R3,OLSYN                         ;OLSYN FOR USE IN SUPDAT
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0A628 90009E60                 JMP RECVSKA
                       ;
                               EVEN
0A62A F0200578         SSSNO   MOVEM R2,RSYN                    ;NO SYNC YET: SET TO -1
                       ;                                        (=SEARCH)
0A62C 90009E60                 JMP RECVSKA                      ; FOR GOOD MEASURE
                       ;
                       ;
                       ; SUPDAT:  CHECK RMODEM BUFFER TO SEE IF THE DATA BIT AT THE
                       ;   EXPECTED SYNC POSITION (START OF BUFFER+SYNCS) HAS THE EXPECTED
                       ;   VALUE.  IF THERE ARE LSTHR ERRORS WITHOUT 2 CONSECUTIVE CORRECT
                       ;   COMPARISONS, CLEAR RSYN TO SIGNIFY LOSS OF FRAME SYNCHRONIZATION.
                       ; ENTER WITH R1 POINTING TO THE LATEST RMODEM BUFFER.  ALSO, THE
                       ;   WORD SYNCS HOLDS THE OFFSET IN THE FRAME THAT POINTS TO THE
                       ;   SYNC WORD TO BE VERIFIED.
                       ;  CALLED FROM RCVR MODEM INTERRUPT SERVICE ROUTINE.
                       ; VARIABLES:
                       ;   SYNCS - BEGINNING OF FRAME OFFSET
                       ;   OLSYN - SYNC BIT FROM PREVIOUS FRAME
                       ;   LSTER - NZ IF SYNC ERROR ON PREVIOUS FRAME
                       ;   ERSYN - COUNTS SYNC ERRORS (FROM LSTHR DOWN TO 0)
                               EVEN
0A62E EC100577         SUPDAT  ADDER R1,SYNCS                   ;R1 NOW POINTS TO NEW SY
                       ;                                        NC WORD
0A630 F0A0A654                 MOVRR R2,RBUS2                   0(2) INDEXED BY BUFN+SYN
                       ;                                        CS
0A632 E420057A                 XORMR R2,OLSYN                   ;XOR WITH LAST SYNC BIT
0A634 2C04                     SRBS 0,R2                        ;SKIP IF DATA BIT SET (G
                       ;                                        OOD SYNC)
0A635 200C                     HOP SUSERR
0A636 F2000578                 CMPMZ LSTER                      ;WAS THERE AN ERROR LAST
0A638 8110A63E                 JMP SUSELF,NEZ                   ;YES
0A63A 90300004                 MOVIR R3,LSTHR                   ;NO:
0A63C F030057C                 MOVRM R3,ERSYN                   ; CORRECT FRAMES, SO RES
                       ;                                        ET ERROR COUNT
0A63E CC000578         SUSELF  MOVZM LSTER                      ;REMEMBER NONERROR FOR N
                       ;                                        EXT FRAME
0A640 2009                     HOP SUSVAL
                       ;
0A641 0800                     EVEN
0A642 90200001         SUSERR  MOVIR R2,1                       ;COME HERE ON SYNC BIT E
                       ;                                        RROR
0A644 F0200578                 MOVRM R2,LSTER                   ;REMEMBER ERROR FOR NEXT
0A646 F400057C                 DECM ERSYN                       ;HAVE WE COUNTED LSTHR E
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                   (02133) ;                                  RRORS?
0A648 F120A650     (02134)          JMP SUSLS,LEZ             ;YES, THEREFORE WE'VE LO
                   (02135) ;                                  ST SYNC
0A64A 90100001     (02136) SUSVAL   MOVIR R1,ID*SRD           ;COMPLEMENT OLSYN IN PRE
                   (02137) ;                                  PARATION
0A64C F510057A     (02138)          XORRM R1,OLSYN            ; FOR USE NEXT FRAME
0A64E 0F70         (02139)          RETURN
                   (02140) ;
0A64F 0800         (02141)          EVEN
0A650 CC00057B     (02142) SUSLS    MOVZM RSYN
0A652 0F70         (02143)          RETURN
0A653 0800         (02144)          EVEN
0A654 00220000     (02145) BUS2     ADDR 0(1,2)               0(2) INDEXED BY R1
                   (02146) ;
                   (02147) UNPFFLS  EVEN
0A656 0280         (02148)          CCS 3                     FROM SRB=2...
0A657 06A0         (02149)          SCS 2                     TO SRB=1
0A658 0200         (02150)          CCS 5                     FROM MRB=2...
0A659 06C0         (02151)          SCS 4                     TO MRB=1
0A65A F200056F     (02152)          CMPZ RDATAS
0A65C 8010A662     (02153)          JMP FL16S,EQ
0A65E 90208F7F     (02154)          MOVIR R2,BF1S-1           NEW DATA IN BUFF 2, SO R
                   (02155) ;                                  EAD BUFF1+SYNC
0A660 8000A664     (02156)          JMP FL17S
0A662 90208FF0     (02157) FL16S    MOVIR R2,BF2S-1           BUFF1(BUFF3) NEW, SO REA
                   (02158) ;                                  D BUFF2+SYNC
0A664 FC200577     (02159) FL17S    ADDMR R2,SYNCS
0A666 9040003D     (02160)          MOVIR R4,LSEN1-1
0A668 D52B9544     (02161)          RMOVE R2,R1,RECVS
0A66A DF000580     (02162)          SMRSL 0,APDNFLS           HAS APDONE HAPPENED?
0A66C 2021         (02163)          HOP #L+34                 NO, HOP TO EVEN LOC AFTE
                   (02164) ;                                  R RET
0A66D 0800         (02165)          EVEN
0A66E CC000580     (02166)          MOVZM APDNFLS
0A670 F1109F0C     (02167)          STORE R1,R1SAV
0A672 F1209F0E     (02168)          STORE R2,R2SAV
0A674 F1309F10     (02169)          STORE R3,R3SAV
0A676 F1409F12     (02170)          STORE R4,R4SAV
0A678 F1509F14     (02171)          STORE R5,R5SAV
0A67A F1609F16     (02172)          STORE R6,R6SAV
0A67C F1709F18     (02173)          STORE R7,R7SAV
0A67E 0F70         (02174)          RET
0A67F 0800         (02175)          EVEN
0A680 A6109F0C     (02176)          LOAD R1,R1SAV
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0A682 A6209F0E (02177)          LOAD R2,R2SAV
0A684 A6309F10 (02178)          LOAD R3,R3SAV
0A686 A6409F12 (02179)          LOAD R4,R4SAV
0A688 A6509F14 (02180)          LOAD R5,R5SAV
0A68A A6609F16 (02181)          LOAD R6,R6SAV
0A68C A6709F18 (02182)          LOAD R7,R7SAV
0A68E 9040003D (02183)          MOVIR R4,LSEN1-1
0A690 D5289582 (02184)          RMOVE R2,R4,RECVS+LSEN1
0A692 DE0005R0 (02185)          SMRSL 0,APDNELS                        HAS APDONE HAPPENED?
0A694 2021     (02186)          HOP #L+34                              NO, HOP TO EVEN LOC AFTE
               (02187) ;                                               R RET
0A695 0800     (02188)          EVEN
0A696 CC0005R0 (02189)          MOVZM APDNELS
0A698 E1109F0C (02190)          STORE R1,R1SAV
0A69A E1209F0E (02191)          STORE R2,R2SAV
0A69C E1309F10 (02192)          STORE R3,R3SAV
0A69E E1409F12 (02193)          STORE R4,R4SAV
0A6A0 E1509F14 (02194)          STORE R5,R5SAV
0A6A2 E1609F16 (02195)          STORE R6,R6SAV
0A6A4 E1709F18 (02196)          STORE R7,R7SAV
0A6A6 0E70     (02197)          RET
0A6A7 0800     (02198)          EVEN
0A6A8 A6109F0C (02199)          LOAD R1,R1SAV
0A6AA A6209F0E (02200)          LOAD R2,R2SAV
0A6AC A6309F10 (02201)          LOAD R3,R3SAV
0A6AE A6409F12 (02202)          LOAD R4,R4SAV
0A6B0 A6509F14 (02203)          LOAD R5,R5SAV
0A6B2 A6609F16 (02204)          LOAD R6,R6SAV
0A6B4 A6709F18 (02205)          LOAD R7,R7SAV
0A6B6 9040003D (02206)          MOVIR R4,LSEN1-1
0A6B8 D52895C0 (02207)          RMOVE R2,R4,RECVS+2*LSEN1
0A6BA DE0005R0 (02208)          SMRSL 0,APDNELS                        HAS APDONE HAPPENED?
0A6BC 2021     (02209)          HOP #L+34                              NO, HOP TO EVEN LOC AFTE
               (02210) ;                                               R RET
0A6BD 0800     (02211)          EVEN
0A6BE CC0005R0 (02212)          MOVZM APDNELS
0A6C0 E1109F0C (02213)          STORE R1,R1SAV
0A6C2 E1209F0E (02214)          STORE R2,R2SAV
0A6C4 E1309F10 (02215)          STORE R3,R3SAV
0A6C6 E1409F12 (02216)          STORE R4,R4SAV
0A6C8 E1509F14 (02217)          STORE R5,R5SAV
0A6CA E1609F16 (02218)          STORE R6,R6SAV
0A6CC E1709F18 (02219)          STORE R7,R7SAV
0A6CE 0E70     (02220)          RET
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0A6CE 0800       (02221)       EVEN
0A6D0 A6109E0C   (02222)       LOAD R1,R1SAV
0A6D2 A6209E0E   (02223)       LOAD R2,R2SAV
0A6D4 A6309E10   (02224)       LOAD R3,R3SAV
0A6D6 A6409E12   (02225)       LOAD R4,R4SAV
0A6D8 A6509E14   (02226)       LOAD R5,R5SAV
0A6DA A6609E16   (02227)       LOAD R6,R6SAV
0A6DC A6709E18   (02228)       LOAD R7,R7SAV
0A6DE 9040003D   (02229)       MOVIR R4,LSEN1-1
0A6E0 D5289SEE   (02230)       RMOVE R2,R4,RECVS+3*LSEN1
0A6E2 DE000580   (02231)       SMBSL 0,APDNELS                            HAS APDONE HAPPENED?
0A6E4 2021       (02232)       HOP *L+34                                  NO, HOP TO EVEN LOC AFTE
                 (02233) ;                                                R RET
0A6E5 0800       (02234)       EVEN
0A6E6 CC000580   (02235)       MOVZM APDNELS
0A6E8 E1109E0C   (02236)       STORE R1,R1SAV
0A6EA E1209E0E   (02237)       STORE R2,R2SAV
0A6EC E1309E10   (02238)       STORE R3,R3SAV
0A6EE E1409E12   (02239)       STORE R4,R4SAV
0A6F0 E1509E14   (02240)       STORE R5,R5SAV
0A6F2 E1609E16   (02241)       STORE R6,R6SAV
0A6F4 E1709E18   (02242)       STORE R7,R7SAV
0A6F6 0E70       (02243)       RET
0A6F7 0800       (02244)       EVEN
0A6F8 A6109E0C   (02245)       LOAD R1,R1SAV
0A6FA A6209E0E   (02246)       LOAD R2,R2SAV
0A6FC A6309E10   (02247)       LOAD R3,R3SAV
0A6FE A6409E12   (02248)       LOAD R4,R4SAV
0A700 A6509E14   (02249)       LOAD R5,R5SAV
0A702 A6609E16   (02250)       LOAD R6,R6SAV
0A704 A6709E18   (02251)       LOAD R7,R7SAV
0A706 9040003D   (02252)       MOVIR R4,LSEN1-1
0A708 D528963C   (02253)       RMOVE R2,R4,RECVS+4*LSEN1
0A70A DE000580   (02254)       SMBSL 0,APDNELS                            HAS APDONE HAPPENED?
0A70C 2021       (02255)       HOP *L+34                                  NO, HOP TO EVEN LOC AFTE
                 (02256) ;                                                R RET
0A70D 0800       (02257)       EVEN
0A70E CC000580   (02258)       MOVZM APDNELS
0A710 E1109E0C   (02259)       STORE R1,R1SAV
0A712 E1209E0E   (02260)       STORE R2,R2SAV
0A714 E1309E10   (02261)       STORE R3,R3SAV
0A716 E1409E12   (02262)       STORE R4,R4SAV
0A718 E1509E14   (02263)       STORE R5,R5SAV
0A71A E1609E16   (02264)       STORE R6,R6SAV
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0A71C F1709F18 (02265)        STORE R7,R7SAV
0A71E 0F70     (02266)        RET
0A71F 0800     (02267)        EVEN
0A720 A6109F0C (02268)        LOAD R1,R1SAV
0A722 A6209F0E (02269)        LOAD R2,R2SAV
0A724 A6309F10 (02270)        LOAD R3,R3SAV
0A726 A6409F12 (02271)        LOAD R4,R4SAV
0A728 A6509F14 (02272)        LOAD R5,R5SAV
0A72A A6609F16 (02273)        LOAD R6,R6SAV
0A72C A6709F18 (02274)        LOAD R7,R7SAV
0A72E 9040003A (02275)        MOVIR R4,LSEN1-4
0A730 D5289E7A (02276)        BMOVE R2,R4,RECVS+5*LSEN1
0A732 DE0005B0 (02277)        SMBSL 0,APDNFLS                          HAS APDONE HAPPENED?
0A734 2C21     (02278)        HOP #L+34                                NO, HOP TO EVEN LOC AFTE
               (02279) ;                                                R RET
0A735 0800     (02280)        EVEN
0A736 CC0005B0 (02281)        MOVZ3 APDNFLS
0A738 F1109F0C (02282)        STORE R1,R1SAV
0A73A F1209F0E (02283)        STORE R2,R2SAV
0A73C F1309F10 (02284)        STORE R3,R3SAV
0A73E F1409F12 (02285)        STORE R4,R4SAV
0A740 F1509F14 (02286)        STORE R5,R5SAV
0A742 F1609F16 (02287)        STORE R6,R6SAV
0A744 F1709F18 (02288)        STORE R7,R7SAV
0A746 0F70     (02289)        RET
0A747 0800     (02290)        EVEN
0A748 A6109F0C (02291)        LOAD R1,R1SAV
0A74A A6209F0E (02292)        LOAD R2,R2SAV
0A74C A6309F10 (02293)        LOAD R3,R3SAV
0A74E A6409F12 (02294)        LOAD R4,R4SAV
0A750 A6509F14 (02295)        LOAD R5,R5SAV
0A752 A6609F16 (02296)        LOAD R6,R6SAV
0A754 A6709F18 (02297)        LOAD R7,R7SAV
               (02298) *  JMP DSRBUFS      NOT ENOUGH TIME TO CORRECT
0A756 8000A758 (02299)        JMP BCHDOS                               CORRECT SIDEBAND
               (02300)        EJECT
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                   (02301) ***** BCH DECODING OF SIDEBAND & PART OF MAINBAND DATA
                   (02302) BCHD0S  EVEN
0A758 90100001 (02303)         MOVIR R1,1                     SET INPUT BUFFER POINTER
0A75A CF009FEA (02304)         MOVZML NESS-2                  CLEAR ERROR COUNTERS(R1,
                   (02305) ;                                  R2)
0A75C DF000580 (02306) BCHD1S  SMBSL 0,APDNELS                HAS APDONE HAPPENED?
0A75E 2021        (02307)         HOP #1+34                   NO, HOP TO EVEN LOC AFTE
                   (02308) ;                                  R RET
0A75F 0800        (02309)         EVEN
0A760 CC000580 (02310)         MOVZM APDNELS
0A762 F1109F0C (02311)         STORE R1,R1SAV
0A764 F1209F0E (02312)         STORE R2,R2SAV
0A766 F1309F10 (02313)         STORE R3,R3SAV
0A768 F1409F12 (02314)         STORE R4,R4SAV
0A76A F1509F14 (02315)         STORE R5,R5SAV
0A76C F1609F16 (02316)         STORE R6,R6SAV
0A76E F1709F18 (02317)         STORE R7,R7SAV
0A770 0F70        (02318)         RET
0A771 0800        (02319)         EVEN
0A772 A6109F0C (02320)         LOAD R1,R1SAV
0A774 A6209F0E (02321)         LOAD R2,R2SAV
0A776 A6309F10 (02322)         LOAD R3,R3SAV
0A778 A6409F12 (02323)         LOAD R4,R4SAV
0A77A A6509F14 (02324)         LOAD R5,R5SAV
0A77C A6609F16 (02325)         LOAD R6,R6SAV
0A77E A6709F18 (02326)         LOAD R7,R7SAV
0A780 905000BA (02327)         MOVIR R5,186                   R5=# OF POWER SUM TABLE
0A782 0020        (02328)         CLR R2                      CLEAR POWER SUM S1
0A783 0030        (02329)         CLR R3                      CLEAR POWER SUM S3
0A784 0040        (02330)         CLR R4                      CLEAR POWER SUM S5
0A785 0800        (02331)         EVEN
0A786 DF029544 (02332) BCHD2S  SMBSL 0,RECVS(R1)              READ INPUT DATA
0A788 2009        (02333)         HOP BCHD3S
0A789 0800        (02334)         EVEN
0A78A F06A9CFC (02335)         MOVMR R6,TBPSMS(R5)
0A78C 442C        (02336)         XORRR R2,R6
0A78D 0800        (02337)         EVEN
0A78E C06A9CFD (02338)         MOVMRL R6,TBPSMS+1(R5)
0A790 443C        (02339)         XORRR R3,R6
0A791 444F        (02340)         XORRR R4,R7
0A792 DF000580 (02341) BCHD3S  SMBSL 0,APDNELS                HAS APDONE HAPPENED?
0A794 2021        (02342)         HOP #1+34                   NO, HOP TO EVEN LOC AFTE
                   (02343) ;                                  R RET
0A795 0800        (02344)         EVEN
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0A796 CC000580 (02345)        MOVZM APDNELS
0A798 F1109E0C (02346)        STORE R1,R1SAV
0A79A F1209E0E (02347)        STORE R2,R2SAV
0A79C F1309E10 (02348)        STORE R3,R3SAV
0A79E F1409E12 (02349)        STORE R4,R4SAV
0A7A0 F1509E14 (02350)        STORE R5,R5SAV
0A7A2 F1609E16 (02351)        STORE R6,R6SAV
0A7A4 F1709E18 (02352)        STORE R7,R7SAV
0A7A6 0E70     (02353)        RET
0A7A7 0800     (02354)        EVEN
0A7A8 A6109E0C (02355)        LOAD R1,R1SAV
0A7AA A6209E0E (02356)        LOAD R2,R2SAV
0A7AC A6309E10 (02357)        LOAD R3,R3SAV
0A7AE A6409E12 (02358)        LOAD R4,R4SAV
0A7B0 A6509E14 (02359)        LOAD R5,R5SAV
0A7B2 A6609E16 (02360)        LOAD R6,R6SAV
0A7B4 A6709E18 (02361)        LOAD R7,R7SAV
0A7B6 2611     (02362)        INCR R1,1                                          INCREAMENT INPUT BUFFER
               (02363) ;                                                         POINTER
0A7B7 2753     (02364)        DECR R5,3
0A7B8 R130A7B6 (02365)        JMP BCHD2S,GE
               (02366) ;  POWER SUMS(S1,S3,S5) ARE CALCULATEED AND STORED IN R2,R3,R4
               (02367) ;  CHECK THE RANGE OF ERRORS
0A7BA DE000580 (02368)        SBKSL 0,APDNELS                                    HAS APDONE HAPPENED?
0A7BC 2021     (02369)        HOP #L+34                                          NO, HOP TO EVEN LOC AFTE
               (02370) ;                                                         R RET
0A7BD 0800     (02371)        EVEN
0A7BE CC000580 (02372)        MOVZM APDNELS
0A7C0 F1109E0C (02373)        STORE R1,R1SAV
0A7C2 F1209E0E (02374)        STORE R2,R2SAV
0A7C4 F1309E10 (02375)        STORE R3,R3SAV
0A7C6 F1409E12 (02376)        STORE R4,R4SAV
0A7C8 F1509E14 (02377)        STORE R5,R5SAV
0A7CA F1609E16 (02378)        STORE R6,R6SAV
0A7CC F1709E18 (02379)        STORE R7,R7SAV
0A7CE 0E70     (02380)        RET
0A7CF 0800     (02381)        EVEN
0A7D0 A6109E0C (02382)        LOAD R1,R1SAV
0A7D2 A6209E0E (02383)        LOAD R2,R2SAV
0A7D4 A6309E10 (02384)        LOAD R3,R3SAV
0A7D6 A6409E12 (02385)        LOAD R4,R4SAV
0A7D8 A6509E14 (02386)        LOAD R5,R5SAV
0A7DA A6609E16 (02387)        LOAD R6,R6SAV
0A7DC A6709E18 (02388)        LOAD R7,R7SAV
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0A7DE 3054      (02389)          MOVRR R5,R2
0A7DF 3C56      (02390)          ADDRR R5,R3
0A7E0 3C58      (02391)          ADDRR R5,R4
0A7E1 0800      (02392)          EVEN
0A7E2 8010AR94  (02393)          JMP RCHDAS,EQ                    NO ERROR IF R5=0
                (02394) ;  CALCULATE DET3=R7=S1**3+S3=R2**3+R3
0A7E4 CC009FFA  (02395)          MOVZM RESTS                      CLEAR ERROR COUNTER
0A7E6 3074      (02396)          MOVRR R7,R2
0A7E7 0800      (02397)          EVEN
0A7E8 8010AR06  (02398)          JMP RCHDSS,EQ
0A7EA F0749FFS  (02399)          MOVMR R7,TRPRCS(R2)
0A7EC 406F      (02400)          MOVRR R6,R7
0A7ED 3CCC      (02401)          ADDRR R6,R6
0A7EE 9260003F  (02402)          CMPIR R6,63                      CHECK R6<63
0A7F0 1A30      (02403)          SKPL LT
0A7F1 9E60003F  (02404)          SUBIR R6,63
0A7F3 0800      (02405)          EVEN
0A7F4 F0609F00  (02406)          MOVRM R6,S1SPS                   STORE POWER INDEX OF S1*
                (02407) ;                                         *2
0A7F6 4C6F      (02408)          ADDRR R6,R7
0A7F7 0800      (02409)          EVEN
0A7F8 9260003F  (02410)          CMPIR R6,63
0A7FA 1A30      (02411)          SKPL LT
0A7FB 9E60003F  (02412)          SUBIR R6,63
                (02413) ;  READ PRC TABLE FOR S1**3
0A7FD 0800      (02414)          EVEN
0A7FE F07C9DR9  (02415)          MOVMR R7,TRPRCS(R6)
0A800 4476      (02416) RCHDSS   XORRR R7,R3                      R7=S1**3+S3
0A801 0800      (02417)          EVEN
0A802 8010ARAA  (02418)          JMP RCHDRS,EQ                    GO TO RCHDRS IF R7=0
                (02419) ;  MORE THAN TWO ERRORSOCCUR
                (02420) ;  CALCULATE SIGMA2 AND SIGMA3
                (02421) ;  CALCULATE S1**2*S3+S5 FOR SIGMA2 CALC.
0A804 0220      (02422)          TEST R2
0A805 1910      (02423)          SKP NE
0A806 0C30      (02424)          CLR R3
0A807 0230      (02425)          TEST R3
0A808 8010AR16  (02426)          JMP RCHDTS,EQ
0A80A F0569DER  (02427)          MOVMR R5,TRPRCS(R3)
0A80C FC509F00  (02428)          ADDMR R5,S1SPS
0A80E 9250003F  (02429)          CMPIR R5,63
0A810 1A30      (02430)          SKPL LT
0A811 9E50003F  (02431)          SUBIR R5,63
                (02432) ;  READ PRC TABLE
```

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0AB13 0800         (02433)           EVEN
0AB14 E03A9EB9     (02434)           MOVSE R3,TBRPCS(R5)
0AB16 C6000580     (02435) BCHELS    SPRSE 6,APDFLGS        HAS APDONE HAPPENED?
0AB19 2021         (02436)           HOP $1+34              NO, HOP TO EVEN LOC AFTE
                   (02437) ;                                R RET
0AB19 0800         (02438)           EVEN
0AB1A CC000580     (02439)           MOVZR APDFLGS
0AB1C E1109E0C     (02440)           STORE E1,R1SAV
0AB1E E1209E0E     (02441)           STORE R2,R2SAV
0AB20 E1309E10     (02442)           STORE R3,R3SAV
0AB22 E1409E12     (02443)           STORE R4,R4SAV
0AB24 E1509E14     (02444)           STORE R5,R5SAV
0AB26 E1609E16     (02445)           STORE R6,R6SAV
0AB28 E1709E18     (02446)           STORE R7,R7SAV
0AB2A 0E70         (02447)           RET
0AB2B 0800         (02448)           EVEN
0AB2C A6109E0C     (02449)           LOAD R1,R1SAV
0AB2E A6209E0E     (02450)           LOAD R2,R2SAV
0AB30 A6309E10     (02451)           LOAD R3,R3SAV
0AB32 A6409E12     (02452)           LOAD R4,R4SAV
0AB34 A6509E14     (02453)           LOAD R5,R5SAV
0AB36 A6609E16     (02454)           LOAD R6,R6SAV
0AB38 A6709E18     (02455)           LOAD R7,R7SAV
0AB3A 4438         (02456)           XORRR R3,R4            R3=S1**2*S3+S5
0AB3B 4046         (02457)           MOVRR R4,R3            R4=R3
0AB3C 8010AB58     (02458)           JMP BCHDUS,E0
0AB3E E0669DEB     (02459)           MOVMR R6,TBRPCS(R3)
                   (02460) ;  READ RPC TABLE FOR R7
0AB40 E03E9DEB     (02461)           MOVMR R3,TBRPCS(R7)
0AB42 4E66         (02462)           SUBRR R6,R3            R6=R6/R3
0AB43 1830         (02463)           SKPL GE
0AB44 9C60003E     (02464)           ADDIR R6,63
0AB46 E03C9D69     (02465)           MOVMR R3,TBRPCS(R6)    SIGMA2=R3
                   (02466) ;  CALCULATE SIGMA3
0AB48 4044         (02467)           MOVRR R4,R2
0AB49 0800         (02468)           EVEN
0AB4A 8010AB58     (02469)           JMP BCHDUS,E0
0AB4C E0549DEB     (02470)           MOVMR R5,TBRPCS(R2)
0AB4E 4C5C         (02471)           ADDRR R5,R6
0AB4F 0800         (02472)           EVEN
0AB50 9250003E     (02473)           CMPIR R5,63
0AB52 1A30         (02474)           SKPL LT
0AB53 9E50003E     (02475)           SUBIR R5,63
0AB55 0800         (02476)           EVEN
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0A856 F03A9CB9 (02477)          MOVMR R4,TBPRCS(R5)
0A858 441E     (02478) BCHD0S   XORRR R4,R7            R4=R7+S1*SIGMA2
0A859 0B00     (02479)          EVEN
0A85A 801CA8E0 (02480)          JMP BCHDCS,E0          TWO ERRORS IF R4=0
               (02481) ;  3 OR MORE ERRORS OCCUR
0A85C E8069FFC (02482)          MOVEM 3,NESS
0A85E 9051FFC2 (02483)          MOVIR R5,-62
               (02484) ;  CHECK THE FIRST POSITION
0A860 4064     (02485)          MOVRR R6,R2
0A861 4466     (02486)          XORRR R6,R3
0A862 4468     (02487)          XORRR R6,R4
0A863 2761     (02488)          DECR R6,1
0A864 8110A86A (02489)          JMP BCHD5S,NE
               (02490) ;  STORE ERROR POSITION
0A866 E5009FFB (02491)          INCM NESTS
0A868 F0109FFD (02492)          MOVRM R1,NESS+1
               (02493) ;  MULTIPLY ALPA TO R2
0A86A F0249E3B (02494) BCHD5S   MOVMR R2,TBAL1S(R2)
               (02495) ;  MULTIPLY ALPA**2 TO R3
0A86C F0369E78 (02496)          MOVMR R3,TBAL2S(R3)
0A86E F0489EB8 (02497)          MOVMR R4,TBAL3S(R4)
0A870 4064     (02498)          MOVRR R6,R2
0A871 4466     (02499)          XORRR R6,R3
0A872 4468     (02500)          XORRR R6,R4
0A873 2761     (02501)          DECR R6,1
0A874 8110A87E (02502)          JMP BCHD4S,NE
               (02503) ;  STORE ERROR POSITION
0A876 E5009FFB (02504)          INCM NESTS
0A878 407A     (02505)          MOVRR R7,R5
0A879 4C72     (02506)          ADDRR R7,R1            R7 IS THE ERROR POSITION
0A87A F0609FFB (02507)          MOVMR R6,NESTS
0A87C F07C9FFC (02508)          MOVRM R7,NESS(R6)
0A87E B950A86A (02509) BCHD4S   IJN R5,BCHD5S
               (02510) ;  CHECK ERROR CORRECTION STATUS
0A880 F0509FFC (02511)          MOVMR R5,NESS
0A882 F2509FFB (02512)          CMPMR R5,NESTS
0A884 8110A8A6 (02513)          JMP BCHDPS,NE
               (02514) ;  CORRECT 3 ERRORS
0A886 90600001 (02515)          MOVIR R6,1
0A888 F0709FFD (02516)          MOVMR R7,NESS+1
0A88A F56F9543 (02517)          XORRM R6,RECVS-1(R7)
0A88C F0709FFE (02518)          MOVMR R7,NESS+2
0A88E F56F9543 (02519)          XORRM R6,RECVS-1(R7)
0A890 F0709FFF (02520)          MOVMR R7,NESS+3
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0AB92 E56E9543 (02521)          XORRM R6,RECVS-1(R7)
0AB94 E0609EEC (02522) BCHDAS  MOVRF R6,MESS
0AB96 92100040 (02523)          CMPIR R1,64
0AB98 1610     (02524)          SKPL GE
0AB99 E0609EEA (02525)          MOVRM R6,MESS-2
0AB9B 0800     (02526)          EVEN
0AB9C 9210007F (02527)          CMPIR R1,127
0AB9E 1610     (02528)          SKPL GE
0AB9F E0609EEB (02529)          MOVRM R6,MESS-1
0ABA1 0800     (02530)          EVEN
               (02531) *  CMPIR R1,169
               (02532) *  JMP BCHDIS,LT
0ABA2 8000ABD4 (02533)          JMP DSRBDES                    CORRECT ONLY SIDEBAND
               (02534) *
               (02535) *
               (02536) ;  END OF BCH DECODER EXCUTION
               (02537) *
0ABA4 8000ABD2 (02538)          JMP ENDDCS
               (02539) *
               (02540) *
               (02541) *
               (02542) *
0ABA6 90309EEC (02543) BCHDDS  MOVIR 4,MESS
0ABA8 8000AB94 (02544)          JMP BCHDAS
               (02545) ;  CORRECT 1 OR 2 ERRORS
0ABAA E8029EEC (02546) BCHDBS  MOVLM 1,MESS
0ABAC 0F30     (02547)          CLR R3
0ABAD 0800     (02548)          EVEN
0ABAE 8000ABB2 (02549)          JMP BCHDCS+2
0ABB0 E8049EEC (02550) BCHDCS  MOVLM 2,MESS                   2 ERRORS
0ABB2 9051EEC2 (02551)          MOVIR R5,-62
0ABB4 4064     (02552)          MOVRR R6,R2
0ABB5 4466     (02553)          XORRR R6,R3
0ABB6 2761     (02554)          DECR R6,1
0ABB7 0800     (02555)          EVEN
0ABB8 8119ABBE (02556)          JMP BCH25S,EF
               (02557) ;  CORRECT ERROR
0ABBA 90600001 (02558)          MOVIR R6,1
0ABBC E5629543 (02559)          XORRM R6,RECVS-1(R1)
0ABBE E0249E38 (02560) BCH25S  MOVRR R2,TBAL1S(R2)
0ABC0 E0369E78 (02561)          MOVRR R3,TBAL2S(R3)
0ABC2 4064     (02562)          MOVRR R6,R2
0ABC3 4466     (02563)          XORRR R6,R3                    R6=R2+R3
0ABC4 2761     (02564)          DECR R6,1
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0ABC5 0800       (02565)          EVEN
0ABC6 8110ABCF   (02566)          JMP BCH24$,9F
                 (02567) ;  CORRECT ERRORS
0ABC8 407A       (02568)          MOVRR R7,R5
0ABC9 4C72       (02569)          ADDRR R7,R1
0ABCA 96600001   (02570)          MOVIR R6,1
0ABCC E56F9543   (02571)          XORRM R6,RECVS-1(R7)
0ABCE 8950ABBF   (02572) BCH24$   IJN R5,BCH25$
0ABD0 8000AB94   (02573)          JMP BCHDAS
                 (02574) *
                 (02575) *
                 (02576) ;  END OF BCH DECODING LIST
                 (02577) ENDDCS   EVEN
0ABD2 8000ABD4   (02578)          JMP DSPBUFS
                 (02579)          EJECT
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                (02580) ***** DESERIALIZE SIDEBAND & MAINBAND PARAMETTERS
                (02581) DSRBUFS EVEN
0ABE3 0200      (02582)         CCS 3                          FROM SRB=2...
0ABD5 06A0      (02583)         SCS 2                          TO SRB=1
0ABD6 0200      (02584)         CCS 5                          FROM MRB=2...
0ABD7 06C0      (02585)         SCS 4                          TO MRB=1
0ABD8 DE000580  (02586)         SMBSL 0,APDNELS                HAS APDONE HAPPENED?
0ABDA 2021      (02587)         HOP *L+34                      NO, HOP TO EVEN LOC AFTE
                (02588) ;                                      R RET
0ABDB 0800      (02589)         EVEN
0ABDC CC000580  (02590)         MOVZM APDNELS
0ABDE E1109E0C  (02591)         STORE R1,R1SAV
0ABE0 E1209E0E  (02592)         STORE R2,R2SAV
0ABE2 E1309E10  (02593)         STORE R3,R3SAV
0ABE4 E1409E12  (02594)         STORE R4,R4SAV
0ABE6 E1509E14  (02595)         STORE R5,R5SAV
0ABE8 E1609E16  (02596)         STORE R6,R6SAV
0ABEA E1709E18  (02597)         STORE R7,R7SAV
0ABEC 0E70      (02598)         RET
0ABED 0E00      (02599)         EVEN
0ABEE A6109E0C  (02600)         LOAD R1,R1SAV
0ABF0 A6209E0E  (02601)         LOAD R2,R2SAV
0ABF2 A6309E10  (02602)         LOAD R3,R3SAV
0ABF4 A6409E12  (02603)         LOAD R4,R4SAV
0ABF6 A6509E14  (02604)         LOAD R5,R5SAV
0ABF8 A6609E16  (02605)         LOAD R6,R6SAV
0ABFA A6709E18  (02606)         LOAD R7,R7SAV
0ABFC 0D20      (02607)         CLR R2
0ABFD 0E00      (02608)         EVEN
0ABFE 2621      (02609)         INCR R2,1                      SKIP THE SYNC BIT
0ABFF 0800      (02610)         EVEN
0A900 0D40      (02611)         CLR R4
0A901 0800      (02612)         EVEN
0A902 E0509C6C  (02613)         MOVMR R5,PARMSM2               LOAD R5 WITH THE NUMBER
                (02614) ;                                      OF PARAMETERS-2
                (02615) *
0A904 CC069666  (02616) LOOPS1  MOVZM  RUPRS(R4)               ZERO OUT THE REC'D PARM
                (02617) ;                                      BUFFER
0A906 DE000580  (02618)         SMBSL 0,APDNELS                HAS APDONE HAPPENED?
0A908 2021      (02619)         HOP *L+34                      NO, HOP TO EVEN LOC AFTE
                (02620) ;                                      R RET
0A909 0800      (02621)         EVEN
0A90A CC000580  (02622)         MOVZM APDNELS
0A90C E1109E0C  (02623)         STORE R1,R1SAV
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0A90E E1209E0E (02624)          STORE R2,R2SAV
0A910 E1309E10 (02625)          STORE R3,R3SAV
0A912 E1409E12 (02626)          STORE R4,R4SAV
0A914 E1509E14 (02627)          STORE R5,R5SAV
0A916 E1609E16 (02628)          STORE R6,R6SAV
0A918 E1709E18 (02629)          STORE R7,R7SAV
0A91A 0E70     (02630)          RET
0A91B 0800     (02631)          EVEN
0A91C A6109E0C (02632)          LOAD R1,R1SAV
0A91E A6209E0E (02633)          LOAD R2,R2SAV
0A920 A6309E10 (02634)          LOAD R3,R3SAV
0A922 A6409E12 (02635)          LOAD R4,R4SAV
0A924 A6509E14 (02636)          LOAD R5,R5SAV
0A926 A6609E16 (02637)          LOAD R6,R6SAV
0A928 A6709E18 (02638)          LOAD R7,R7SAV
0A92A 808A9C62 (02639)          JMP @INDX4$(R5)
               (02640)          EVEN
0A92C DA049544 (02641) FBIT5S   SMBCL 0,RECVS(R2)           SKIP IF THE REC'D BIT IS
0A92E D2589686 (02642)          SMB 5,ROPBS(R4)             SET BIT 5 OF PARM TO BE
               (02643) ;                                    A 1
0A930 2621     (02644)          INCR R2,1                   INCREMENT R2 BY 1
0A931 0800     (02645)          EVEN
               (02646) *
0A932 DA049544 (02647) FBIT4S   SMBCL 0,RECVS(R2)           SKIP IF THE REC'D BIT IS
0A934 D2489686 (02648)          SMB 4,ROPBS(R4)             SET BIT 4 OF ROPB TO BE
               (02649) ;                                    1
0A936 2621     (02650)          INCR R2,1                   INCREMENT R2 BY 1
0A937 0800     (02651)          EVEN
               (02652) *
0A938 DA049544 (02653) FBIT3S   SMBCL 0,RECVS(R2)           SKIP IF THE REC'D BIT IS
0A93A D2389686 (02654)          SMB 3,ROPBS(R4)             SET BIT 3 OF ROPB TO BE
               (02655) ;                                    1
0A93C 2621     (02656)          INCR R2,1                   INCREMENT R2 BY 1
0A93D 0800     (02657)          EVEN
               (02658) *
0A93E DA049544 (02659) FBIT2S   SMBCL 0,RECVS(R2)           SKIP IF THE REC'D BIT IS
0A940 D2289686 (02660)          SMB 2,ROPBS(R4)             SET BIT 2 OF ROPB TO BE
               (02661) ;                                    1
0A942 2621     (02662)          INCR R2,1                   INCREMENT R2 BY 1
0A943 0800     (02663)          EVEN
               (02664) *
0A944 DA049544 (02665) FBIT1S   SMBCL 0,RECVS(R2)           SKIP IF THE REC'D BIT IS
0A946 D2189686 (02666)          SMB 1,ROPBS(R4)             SET BIT 2 OF ROPB TO BE
               (02667) ;                                    1
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0A948 2621     (02668)          INCR R2,1                INCREMENT R2 BY 1
0A949 0800     (02669)          EVEN
               (02670) *
0A94A DA049544 (02671) FBITOS   SMBCL 0,RECVS(R2)        SKIP IF THE REC'D BIT IS
0A94C D2089686 (02672)          SMB 0,ROPBS(R4)          SET BIT 0 OF ROPB TO BE
               (02673) ;                                 1
0A94E 2621     (02674)          INCR R2,1                INCREMENT R2 BY 1
0A94F 0800     (02675)          EVEN
               (02676) *
0A950 2641     (02677)          INCR R4,1                INCREMENT THE PARM. COUN
               (02678) ;                                 TER BY 1
0A951 0800     (02679)          EVEN
0A952 RE50A904 (02680)          DBJP R5,LOOPS1           AND GOTO THE NEXT ONE
               (02681) *
               (02682) ;
0A954 EC209CBE (02683)          ADDMR R2,EIGTENS         SKIP THE NEXT 18 POSITIO
               (02684) ;                                 NS SINCE THESE ARE PARIT
               (02685) ;                                 Y BITS FOR ERROR CONTROL
0A956 CC089686 (02686)          MOVZB ROPBS(R4)          CLEAR THE PARM BUFFER
0A958 DA049544 (02687)          SMBCL 0,RECVS(R2)        SKIP IF THE REC'D BIT IS
0A95A D2189686 (02688)          SMB 1,ROPBS(R4)          SET BIT 1 OF ROPB TO BE
               (02689) ;                                 1
0A95C 2621     (02690)          INCR R2,1                INCREMENT THE LOOP COUNT
               (02691) ;                                 ER BY ONE
0A95D 0800     (02692)          EVEN
0A95E DA049544 (02693)          SMBCL 0,RECVS(R2)        SKIP IF THE REC'D BIT IS
0A960 D2089686 (02694)          SMB 0,ROPBS(R4)          SET BIT 0 OF ROPB TO BE
               (02695) ;                                 1
0A962 2621     (02696)          INCR R2,1                INCREMENT R2 BY 1
0A963 0800     (02697)          EVEN
               (02698) *
               (02699) *
               (02700) *
               (02701) *
               (02702) ;  FROM THESE DECODED PARAMETERS
               (02703) ;  BIT ASSIGNMENT RULE FOR DESERIALIZATION
               (02704) ;  OF DCT COEFS IS COMPUTED
               (02705) *
               (02706) *
               (02707) *
               (02708) *
               (02709) *
               (02710) *
               (02711) *
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                  (02712) ;  DESERIALIZE THE QUANTIZED DCT COEFS
                  (02713) ;  ASSUMING HORIZONTAL CODING
                  (02714) *
0A964 E609EECE    (02715)         MOVLM CLRSGO,SYSFLGS
0A966 DE000560    (02716) DSODS   SMRSL 0,APDNFLS                              HAS APDONE HAPPENED?
0A968 2021        (02717)         HOP *E+34                                    NO, HOP TO EVEN LOC AFTE
                  (02718) ;                                                    R RET
0A969 0800        (02719)         EVEN
0A96A CC000560    (02720)         MOVZM APDNFLS
0A96C E1109E0C    (02721)         STORE R1,R1SAV
0A96E E1209E0E    (02722)         STORE R2,R2SAV
0A970 E1309E10    (02723)         STORE R3,R3SAV
0A972 E1409E12    (02724)         STORE R4,R4SAV
0A974 E1509E14    (02725)         STORE R5,R5SAV
0A976 E1609E16    (02726)         STORE R6,R6SAV
0A978 E1709E18    (02727)         STORE R7,R7SAV
0A97A 0E70        (02728)         RET
0A97B 0800        (02729)         EVEN
0A97C A6109E0C    (02730)         LOAD R1,R1SAV
0A97E A6209E0E    (02731)         LOAD R2,R2SAV
0A980 A6309E10    (02732)         LOAD R3,R3SAV
0A982 A6409E12    (02733)         LOAD R4,R4SAV
0A984 A6509E14    (02734)         LOAD R5,R5SAV
0A986 A6609E16    (02735)         LOAD R6,R6SAV
0A988 A6709E18    (02736)         LOAD R7,R7SAV
0A98A DE000576    (02737)         SMRSL 0,RGO2                                 HAS AP WRITTEN RIBIT YET
                  (02738) ;                                                    ?
0A98C 8000A966    (02739)         JMP DSODS                                    NO, WAIT FOR OK
0A98E CC000576    (02740)         MOVZM RGO2                                   RESET GO FLAG
0A990 E849EECE    (02741)         MOVLM SETSGO,SYSFLGS
                  (02742) *??????????????????????????????????????????????????????????????????????????
                  (02743) *  THE "BMOVEL" OP'S CAUSE A MEMORY BUS ERROR!
                  (02744) *  REASON IS UNKNOWN, 5/17/80
                  (02745) *  MOVIR R3,ZROS-1
                  (02746) *  MOVIR R4,LTH1-1
                  (02747) *  BMOVEL R3,R4,ROTDCTS
                  (02748) *  BMOVEL R3,R4,ROTDCTS+2*LTH1     MOVE 2 BLOCKS OF 0'S TO ROTDCT
                  (02749) *??????????????????????????????????????????????????????????????????????????
0A992 E1409E12    (02750)         STORE R4,R4SAV                               NEED IT FOR RPT
0A994 114000FF    (02751)         LDRPT R4,LTH-1                               MOVE LONG BUT DECR BY 2!
0A996 CE0896C4    (02752)         MOVZML ROTDCTS(R4)                           ROTDCT(I)=0 FOR 0.LE.I.L
                  (02753) ;                                                    E.255
0A998 E2009C84    (02754)         CMPMZ FRSTF
0A99A 8010A9A0    (02755)         JMP DSOD1S,EQ                                DON'T DESER IF FIRST FRA
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                  (02756) ;                                                   ME
0A99C CC009C83 (02757)          MOVZM ERSTF
0A99E 80009E60 (02758)          JMP RECVSRA
0A9A0 A6409E12 (02759) DSQ01S   LOAD R4,R4SAV                                 RESTORE R4
0A9A2 E0509C8E (02760)          MOVMR R5,FORFORS                              MOVE FORTY FOUR IN R5
0A9A4 2752     (02761)          DECR R5,2
0A9A5 0800     (02762)          EVEN
0A9A6 E0709AA6 (02763)          MOVMR R7,RIBITS                               SAVE THE FIRST IBIT VALU
               (02764) ;                                                      E
0A9A8 2771     (02765)          DECR R7,1                                     DECREMENT R7 BY 1
0A9A9 3A71     (02766)          LLS R7,1                                      SHIFT LEFT BY 1
               (02767)          EVEN
               (02768) ***************************************************************
               (02769) *  SPECIAL CODE TO CORRECT FOR RIBIT=0 CASE 6/12/80
0A9AA 0270     (02770)          TEST R7                                       WHEN RIBIT=0,R7<0 AND @
               (02771) ;                                                      IS NG!
0A9AB 0800     (02772)          EVEN                                          SO TEST & JUMP AROUND SE
               (02773) ;                                                      RIALIZATION SINCE
0A9AC 8030APE6 (02774)          JMP EXITS,LT                                  IBIT=0 IMPLIES NO BITS T
               (02775) ;                                                      O SERIRIALIZE!!
               (02776) *****************************************************************
0A9AE 808E9C7A (02777)          JMP @IGDX5S(R7)                               GOTO THE CORR.DESERIALIZ
               (02778) ;                                                      ATION ROUTINE
               (02779) *
               (02780) ;  DESERIALIZATION ROUTINE FOR BIT 4
               (02781) *
               (02782)          EVEN
0A9B0 DE0005B0 (02783) GBIT4S   SMBSL 0,APDNELS                               HAS APDONE HAPPENED?
0A9B2 2021     (02784)          HOP @L+34                                     NO, HOP TO EVEN LOC AFTE
               (02785) ;                                                      R RET
0A9B3 0800     (02786)          EVEN
0A9B4 CC000590 (02787)          MOVZM APDNELS
0A9B6 E1109E0C (02788)          STORE R1,R1SAV
0A9B8 E1209E0E (02789)          STORE R2,R2SAV
0A9BA E1309E10 (02790)          STORE R3,R3SAV
0A9BC E1409E12 (02791)          STORE R4,R4SAV
0A9BE E1509E14 (02792)          STORE R5,R5SAV
0A9C0 E1609E16 (02793)          STORE R6,R6SAV
0A9C2 E1709E18 (02794)          STORE R7,R7SAV
0A9C4 0E70     (02795)          RET
0A9C5 0800     (02796)          EVEN
0A9C6 A6109E0C (02797)          LOAD R1,R1SAV
0A9C8 A6209E0E (02798)          LOAD R2,R2SAV
0A9CA A6309E10 (02799)          LOAD R3,R3SAV
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0A9CC A6409F12 (02800)         LOAD R4,R4SAV
0A9CE A6509F14 (02801)         LOAD R5,R5SAV
0A9D0 A6609F16 (02802)         LOAD R6,R6SAV
0A9D2 A6709F18 (02803)         LOAD R7,R7SAV
0A9D4 F0709AA6 (02804)         MOVMR R7,RIBITS                 SAVE THE 1ST IBIT VALUE
0A9D6 0D40     (02805)         CLR R4
0A9D7 0800     (02806)         EVEN
0A9D8 F2789AA6 (02807) GBIT4$1 CMPMR R7,RIBITS(R4)             COMPARE THE BIT ASSIGNME
               (02808) ;                                       NT WITH THE MARK
0A9DA 8020AA12 (02809)         JMP GBIT3S,GT                   GOTO NEXT BIT DECODING R
               (02810) ;                                       OUTINE IF BIT ASSIGN. CH
               (02811) ;                                       ANGES
0A9DC DE000580 (02812)         SMBSL 0,APDNFLS                 HAS APDONE HAPPENED?
0A9DE 2021     (02813)         HOP *L+34                       NO, HOP TO EVEN LOC AFTE
               (02814) ;                                       R RET
0A9DF 0800     (02815)         EVEN
0A9E0 CC000580 (02816)         MOVZM APDNFLS
0A9E2 F1109F0C (02817)         STORE R1,R1SAV
0A9E4 F1209F0E (02818)         STORE R2,R2SAV
0A9E6 F1309F10 (02819)         STORE R3,R3SAV
0A9E8 F1409F12 (02820)         STORE R4,R4SAV
0A9EA F1509F14 (02821)         STORE R5,R5SAV
0A9EC F1609F16 (02822)         STORE R6,R6SAV
0A9EE F1709F18 (02823)         STORE R7,R7SAV
0A9F0 0F70     (02824)         RET
0A9F1 0800     (02825)         EVEN
0A9F2 A6109F0C (02826)         LOAD R1,R1SAV
0A9F4 A6209F0E (02827)         LOAD R2,R2SAV
0A9F6 A6309F10 (02828)         LOAD R3,R3SAV
0A9F8 A6409F12 (02829)         LOAD R4,R4SAV
0A9FA A6509F14 (02830)         LOAD R5,R5SAV
0A9FC A6609F16 (02831)         LOAD R6,R6SAV
0A9FE A6709F18 (02832)         LOAD R7,R7SAV
0AA00 DA049544 (02833)         SMBCL 0,RECVS(R2)               SKIP IF BIT 0 OF RECV(R2
               (02834) ;                                       ) IS CLEARED
0AA02 D24896C4 (02835)         SMB 4,ROTDCTS(R4)
0AA04 2641     (02836)         INCR R4,1
0AA05 0800     (02837)         EVEN
0AA06 2621     (02838)         INCR R2,1                       INCREMENT THE BUFFER POS
               (02839) ;                                       ITION COUNTER
0AA07 0800     (02840)         EVEN
0AA08 8C50A9D8 (02841)         PJP R5,GBIT4$1                  CHECK IF R5 +VE
0AA0A F0509CFE (02842)         MOVMR R5,FORFORS                RELOAD THE COUNTER WITH
               (02843) ;                                       44
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0AA0C F2209C86 (02843)          CMPMR R2,POST3S           IS R2 GREATER THAN POST
               (02845) ;                                  3
0AA0E 83209E88 (02846)          XCT CN3PTS,LE             ADD 18 TO R2 IF LESS THA
               (02847) ;                                  N OR EQUAL
0AA10 8000A9E8 (02848)          JMP GBIT4S1               GO BACK TO DBITS1
               (02849) *
               (02850) *
               (02851) ;  DESERIALIZATION FOR BIT 3
               (02852) *
               (02853)          EVEN
0AA12 F2209C89 (02854) GBIT3S   CMPMR R2,POST4S
0AA14 8010A0E6 (02855)          JMP EXITS,EQ
0AA16 1E000580 (02856)          SBBSL 0,APDNFLS           HAS APDONE HAPPENED?
0AA18 2021     (02857)          HOP #L434                 NO, HOP TO EVEN LOC AFTE
               (02858) ;                                  R RET
0AA19 0800     (02859)          EVEN
0AA1A CC000580 (02860)          MOVZM APDNFLS
0AA1C E1109E0C (02861)          STORE R1,R1SAV
0AA1E E1209E0E (02862)          STORE R2,R2SAV
0AA20 E1309E10 (02863)          STORE R3,R3SAV
0AA22 E1409E12 (02864)          STORE R4,R4SAV
0AA24 E1509E14 (02865)          STORE R5,R5SAV
0AA26 E1609E16 (02866)          STORE R6,R6SAV
0AA28 E1709E18 (02867)          STORE R7,R7SAV
0AA2A 0E70     (02868)          RET
0AA2B 0800     (02869)          EVEN
0AA2C A6109E0C (02870)          LOAD R1,R1SAV
0AA2E A6209E0E (02871)          LOAD R2,R2SAV
0AA30 A6309E10 (02872)          LOAD R3,R3SAV
0AA32 A6409E12 (02873)          LOAD R4,R4SAV
0AA34 A6509E14 (02874)          LOAD R5,R5SAV
0AA36 A6609E16 (02875)          LOAD R6,R6SAV
0AA38 A6709E18 (02876)          LOAD R7,R7SAV
0AA3A E0789AA6 (02877)          MOVMR R7,R1BITS(R4)       SAVE THE NEXT 1BIT VALUE
0AA3C 0B40     (02878)          CLR R4
0AA3D 0800     (02879)          EVEN
0AA3E F2789AA6 (02880) GBIT3S1  CMPMR R7,R1BITS(R4)       COMPARE THE BIT ASSIGNME
               (02881) ;                                  NT WITH THE MARK
0AA40 8020AA78 (02882)          JMP GBIT2S,GT             FI NOT EQUAL,GOTO DECODE
0AA42 1E000580 (02883)          SBBSL 0,APDNFLS           HAS APDONE HAPPENED?
0AA44 2021     (02884)          HOP #L434                 NO, HOP TO EVEN LOC AFTE
               (02885) ;                                  R RET
0AA45 0800     (02886)          EVEN
0AA46 CC000580 (02887)          MOVZM APDNFLS
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0AA48 F1109F0C (02888)          STORE R1,R1SAV
0AA4A F1209F0E (02889)          STORE R2,R2SAV
0AA4C F1309F10 (02890)          STORE R3,R3SAV
0AA4E F1309F12 (02891)          STORE R4,R4SAV
0AA50 F1509F14 (02892)          STORE R5,R5SAV
0AA52 F1609F16 (02893)          STORE R6,R6SAV
0AA54 F1709F18 (02894)          STORE R7,R7SAV
0AA56 0E70     (02895)          RET
0AA57 0800     (02896)          EVEN
0AA58 A6109F0C (02897)          LOAD R1,R1SAV
0AA5A A6209F0E (02898)          LOAD R2,R2SAV
0AA5C A6309F10 (02899)          LOAD R3,R3SAV
0AA5E A6309F12 (02900)          LOAD R4,R4SAV
0AA60 A6509F14 (02901)          LOAD R5,R5SAV
0AA62 A6609F16 (02902)          LOAD R6,R6SAV
0AA64 A6709F18 (02903)          LOAD R7,R7SAV
0AA66 DA019544 (02904)          SMBCL 0,RECVS(R2)          SKIP IF BIT 0 OF RECV(R2
               (02905) ;                                   ) IS CLEARED
0AA68 02383EC4 (02906)          SMB 3,POTPCTS(R4)
0AA6A 2641     (02907)          INCR R4,1
0AA6B 0800     (02908)          EVEN
0AA6C 2621     (02909)          INCR R2,1                  INCREMENT THE BUFFER POS
               (02910) ;                                   ITION COUNTER
0AA6D 0800     (02911)          EVEN
0AA6E BC50AA3E (02912)          DJP R5,GBIT3S1             GO BACK TO GBIT3S1
0AA70 F0509C6E (02913)          MOVMR R5,FURFORS           RELOAD THE COUNTER WITH
               (02914) ;                                   44
0AA72 F2209C66 (02915)          CMPMR R2,POST3S            IS R2 GREATER THAN POST
               (02916) ;                                   3
0AA74 83209E88 (02917)          XCT CNTP1S,LE              ADD 18 TO LOOP COUNTER I
               (02918) ;                                   F LESS THAN OR EQUAL TO
0AA76 8000AA3E (02919)          JMP GBIT3S1                GO BACK TO GBIT3S1
               (02920) *
               (02921) *
               (02922) ;  DESERIALIZATION FOR BIT 2
               (02923) *
               (02924)          EVEN
0AA78 F2209C89 (02925) GBIT2S   CMPMR R2,POST4S
0AA7A 8010AB66 (02926)          JMP EXITS,EQ
0AA7C DE000580 (02927)          SMESL 0,APDNFLS            HAS APDONE HAPPENED?
0AA7E 2021     (02928)          HOP #L434                  NO, HOP TO EVEN LOC AFTE
               (02929) ;                                   R RET
0AA7F 0800     (02930)          EVEN
0AA80 CC000580 (02931)          MOVZM APDNFLS
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0AA82 E1109E0C (02932)          STORE R1,R1SAV
0AA84 E1209E0E (02933)          STORE R2,R2SAV
0AA86 E1309E10 (02934)          STORE R3,R3SAV
0AA88 E1409E12 (02935)          STORE R4,R4SAV
0AA8A E1509E14 (02936)          STORE R5,R5SAV
0AA8C E1609E16 (02937)          STORE R6,R6SAV
0AA8E E1709E18 (02938)          STORE R7,R7SAV
0AA90 0E70     (02939)          RET
0AA91 0800     (02940)          EVEN
0AA92 A6109E0C (02941)          LOAD R1,R1SAV
0AA94 A6209E0E (02942)          LOAD R2,R2SAV
0AA96 A6309E10 (02943)          LOAD R3,R3SAV
0AA98 A6409E12 (02944)          LOAD R4,R4SAV
0AA9A A6509E14 (02945)          LOAD R5,R5SAV
0AA9C A6609E16 (02946)          LOAD R6,R6SAV
0AA9E A6709E18 (02947)          LOAD R7,R7SAV
0AAA0 E0789AA6 (02948)          MOVRR R7,RIBITS(R4)                         SAVE THE IBIT VALUE
0AAA2 0040     (02949)          CLR R4
0AAA3 0800     (02950)          EVEN
0AAA4 E2789AA6 (02951) GBIT2S1  CMPRR R7,RIBITS(R4)                         COMPARE THE BIT ASSIGNME
               (02952) ;                                                    NT WITH THE MARK
0AAA6 8020AADE (02953)          JMP GBIT1S,GT                               IF NOT EQUAL,GOTO DECODE
0AAA8 DE0005B0 (02954)          SMBSL 0,APDNELS                             HAS APDONE HAPPENED?
0AAAA 2021     (02955)          HOP #L+34                                   NO, HOP TO EVEN LOC AFTE
               (02956) ;                                                    R RET
0AAAB 0800     (02957)          EVEN
0AAAC CC0005B0 (02958)          MOVZM APDNELS
0AAAE E1109E0C (02959)          STORE R1,R1SAV
0AAB0 E1209E0E (02960)          STORE R2,R2SAV
0AAB2 E1309E10 (02961)          STORE R3,R3SAV
0AAB4 E1409E12 (02962)          STORE R4,R4SAV
0AAB6 E1509E14 (02963)          STORE R5,R5SAV
0AAB8 E1609E16 (02964)          STORE R6,R6SAV
0AABA E1709E18 (02965)          STORE R7,R7SAV
0AABC 0E70     (02966)          RET
0AABD 0800     (02967)          EVEN
0AABE A6109E0C (02968)          LOAD R1,R1SAV
0AAC0 A6209E0E (02969)          LOAD R2,R2SAV
0AAC2 A6309E10 (02970)          LOAD R3,R3SAV
0AAC4 A6409E12 (02971)          LOAD R4,R4SAV
0AAC6 A6509E14 (02972)          LOAD R5,R5SAV
0AAC8 A6609E16 (02973)          LOAD R6,R6SAV
0AACA A6709E18 (02974)          LOAD R7,R7SAV
0AACC DA049544 (02975)          SMBCL 0,RECVS(R2)                           SKIP IF BIT 0 OF RECV(R2
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                   (02976) ;                                  ) IS CLEARED
0AACE E2289RC4     (02977)          SMR 2,EOTDCTS(R4)
0AAD0 2641         (02978)          INCR R4,1
0AAD1 0800         (02979)          EVEN
0AAD2 2621         (02980)          INCR R2,1                 INCREMENT THE BUFFER POS
                   (02981) ;                                  ITION COUNTER
0AAD3 0800         (02982)          EVEN
0AAD3 8C50AAA4     (02983)          DJP R5,GBIT2$1            CHECK IF R5 +VE
0AAD6 E0509CBE     (02984)          MOVMR R5,FOREOPS          RELOAD THE COUNTER WITH
                   (02985) ;                                  44
0AAD8 E2209C86     (02986)          CMPMR R2,POST3S           IS R2 GREATER THAN POST
                   (02987) ;                                  3
0AADA 83209E86     (02988)          XCT CNTP1S,LE             ADD 18 TO LOOP COUNTER I
                   (02989) ;                                  F LESS THAN OR EQUAL
0AADC 8000AAA1     (02990)          JMP GBIT2$1               GO BACK TO GBIT2$1
                   (02991) *
                   (02992) *
                   (02993) *
                   (02994) ;  DESERIALIZATION FOR BIT 1
                   (02995)          EVEN
0AADE E2209C89     (02996) GBIT1S   CMPMR R2,POST4S
0AAE0 8010AAE6     (02997)          JMP EXITS,EQ
0AAE2 DE0005B0     (02998)          SNBSL 0,APDNELS           HAS APDONE HAPPENED?
0AAE4 2021         (02999)          HOP #L+34                 NO, HOP TO EVEN LOC AFTE
                   (03000) ;                                  R RET
0AAE5 0800         (03001)          EVEN
0AAE6 CC0005B0     (03002)          MOVZM APDNELS
0AAE8 E1109E0C     (03003)          STORE R1,R1SAV
0AAEA E1209E0E     (03004)          STORE R2,R2SAV
0AAEC E1309E10     (03005)          STORE R3,R3SAV
0AAEE E1409E12     (03006)          STORE R4,R4SAV
0AAF0 E1509E14     (03007)          STORE R5,R5SAV
0AAF2 E1609E16     (03008)          STORE R6,R6SAV
0AAF4 E1709E18     (03009)          STORE R7,R7SAV
0AAF6 0E70         (03010)          RET
0AAF7 0800         (03011)          EVEN
0AAF8 A6109E0C     (03012)          LOAD R1,R1SAV
0AAFA A6209E0E     (03013)          LOAD R2,R2SAV
0AAFC A6309E10     (03014)          LOAD R3,R3SAV
0AAFE A6409E12     (03015)          LOAD R4,R4SAV
0AB00 A6509E14     (03016)          LOAD R5,R5SAV
0AB02 A6609E16     (03017)          LOAD R6,R6SAV
0AB04 A6709E18     (03018)          LOAD R7,R7SAV
0AB06 E078 9AA6    (03019)          MOVRM R7,R1BITS(R4)       SAVE THE IBIT VALUE
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0AB08 0C40     (03020)         CLR R4
0AB09 0800     (03021)         EVEN
               (03022) *
               (03023) *
0AB0A E2789AA6 (03024) GRITIS1 CMPMR R7,RTBITS(R4)    COMPARE THE BIT ASSIGNME
               (03025) ;                              NT WITH THE MARK
0AB0C 9620AB14 (03026)         JMP GRIT05,GT          GOTO SERIALIZATION ROUTI
               (03027) ;                              NE IF NOT EQUAL
0AB0E BE000580 (03028)         SKBSL 0,APDNELS        HAS APDONE HAPPENED?
0AB10 2021     (03029)         HOP *L+34              NO, HOP TO EVEN LOC AFTE
               (03030) ;                              R RET
0AB11 0800     (03031)         EVEN
0AB12 CC000580 (03032)         MOVZM APDNELS
0AB14 E1109E0C (03033)         STORE R1,R1SAV
0AB16 E1209E0E (03034)         STORE R2,R2SAV
0AB18 E1309E10 (03035)         STORE R3,R3SAV
0AB1A E1409E12 (03036)         STORE R4,R4SAV
0AB1C E1509E14 (03037)         STORE R5,R5SAV
0AB1E E1609E16 (03038)         STORE R6,R6SAV
0AB20 E1709E18 (03039)         STORE R7,R7SAV
0AB22 0E70     (03040)         RET
0AB23 0800     (03041)         EVEN
0AB24 A6109E0C (03042)         LOAD R1,R1SAV
0AB26 A6209E0E (03043)         LOAD R2,R2SAV
0AB28 A6309E10 (03044)         LOAD R3,R3SAV
0AB2A A6409E12 (03045)         LOAD R4,R4SAV
0AB2C A6509E14 (03046)         LOAD R5,R5SAV
0AB2E A6609E16 (03047)         LOAD R6,R6SAV
0AB30 A6709E18 (03048)         LOAD R7,R7SAV
0AB32 DA049544 (03049)         SKBCL 0,RECVS(R2)      SKIP IF BIT 0 OF RECV(R2
               (03050) ;                              ) IS CLEARED
0AB34 D21896C4 (03051)         SMR 1,POTDCTS(R4)
0AB36 2641     (03052)         INCR R4,1
0AB37 0800     (03053)         EVEN
0AB38 2621     (03054)         INCR R2,1              INCREMENT THE BUFFER POS
               (03055) ;                              ITION COUNTER
0AB39 0800     (03056)         EVEN
0AB3A 8C50AB0A (03057)         DJP R5,GRITIS1         CHECK IF R5 +VE
0AB3C F0509CBE (03058)         MOVMR R5,FORFORS       RELOAD THE COUNTER WITH
               (03059) ;                              44
0AB3E E2209C86 (03060)         CMPMR R2,POST13S       IS R2 GREATER THAN POST
               (03061) ;                              3
0AB40 83209E88 (03062)         XCT CNTPIS,LE          ADD 18 TO R2 IF LESS THA
               (03063) ;                              N OR EQUAL TO
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0AB42 B000AB02 (03064)          JMP GBIT1S1              GO BACK TO GBIT1S1
               (03065) *
               (03066) *
               (03067) ;  DESERIALIZATION OF BIT 0
               (03068)          EVEN
0AB44 F2209C89 (03069) GBIT0S   CMPSR R2,POST4S          COMPARE R2 WITH THE FRAM
               (03070) ;                                 E LENGTH
0AB46 B010ABE6 (03071)          JMP EXITS,EQ             LEAVE IF THE ENTIRE FRAM
               (03072) ;                                 E IS FINISHED
0AB48 DE0005B0 (03073)          SMPSL 0,APDNELS          HAS APDONE HAPPENED?
0AB4A 2021     (03074)          HOP #L+34                NO, HOP TO EVEN LOC AFTE
               (03075) ;                                 R RET
0AB4B 0800     (03076)          EVEN
0AB4C CC0005B0 (03077)          MOVZM APDNELS
0AB4E F1109E0C (03078)          STORE R1,R1SAV
0AB50 F1209E0E (03079)          STORE R2,R2SAV
0AB52 F1309E10 (03080)          STORE R3,R3SAV
0AB54 F1409E12 (03081)          STORE R4,R4SAV
0AB56 F1509E14 (03082)          STORE R5,R5SAV
0AB58 F1609E16 (03083)          STORE R6,R6SAV
0AB5A F1709E18 (03084)          STORE R7,R7SAV
0AB5C 0E70     (03085)          RET
0AB5D 0800     (03086)          EVEN
0AB5E A6109E0C (03087)          LOAD R1,R1SAV
0AB60 A6209E0E (03088)          LOAD R2,R2SAV
0AB62 A6309E10 (03089)          LOAD R3,R3SAV
0AB64 A6409E12 (03090)          LOAD R4,R4SAV
0AB66 A6509E14 (03091)          LOAD R5,R5SAV
0AB68 A6609E16 (03092)          LOAD R6,R6SAV
0AB6A A6709E18 (03093)          LOAD R7,R7SAV
0AB6C F2209C86 (03094)          CMPMR R2,POST3S          COMPARE R2 WITH POST3
0AB6E B020ABB2 (03095)          JMP BBIT0S,GT            IF GREATER THAN POST3, N
               (03096) ;                                 O NEED TO PUT IN PARITY
               (03097) ;                                 BITS
               (03098) *
               (03099) *
0AB70 F0609C89 (03100)          MOVMR R6,POST4S          MOVE THE FRAME LENGTH TO
0AB72 4E64     (03101)          SUBPR R6,R2              R6=LSEN-1-R2
0AB73 0800     (03102)          EVEN
0AB74 0140     (03103)          CLR R4                   CLEAR R4
0AB75 0800     (03104)          EVEN
0AB76 9C209543 (03105)          ADDIR R2,RECVS-1         SET R2 TO BE THE ADDRESS
               (03106) ;                                 :RECVS(R2)
0AB78 3022     (03107) GBIT0S1  POPXI R2,R1              POP RECV(R2)-->R1...R2=R
```

```
                     (03108) ;                                                        2+1
0AB79 2A02           (03109)          SRBCL 0,R1                                      DON'T CHANGE ROTDCT IF 0
0AB7A E2089EC4       (03110)          SRB 0,ROTDCTS(R4)                               SET LOW BIT OF THE ROTDC
                     (03111) ;                                                        T PARM
0AB7C 2641           (03112)          INCR R4,1                                       INCREMENT R4 BY 1
0AB7D 0800           (03113)          EVEN
0AB7E DE000580       (03114)          SRBSL 0,APDNELS                                 HAS APDONE HAPPENED?
0AB80 2021           (03115)          HOP #L+34                                       NO, HOP TO EVEN LOC AFTE
                     (03116) ;                                                        R RET
0AB81 0800           (03117)          EVEN
0AB82 CC000580       (03118)          MOVZM APDNELS
0AB83 E1109E0C       (03119)          STORE R1,R1SAV
0AB86 E1209E0E       (03120)          STORE R2,R2SAV
0AB88 E1309E10       (03121)          STORE R3,R3SAV
0AB8A E1409E12       (03122)          STORE R4,R4SAV
0AB8C E1509E14       (03123)          STORE R5,R5SAV
0AB8E E1609E16       (03124)          STORE R6,R6SAV
0AB90 E1709E18       (03125)          STORE R7,R7SAV
0AB92 0E70           (03126)          RET
0AB93 0800           (03127)          EVEN
0AB94 A6109E0C       (03128)          LOAD R1,R1SAV
0AB96 A6209E0E       (03129)          LOAD R2,R2SAV
0AB98 A6309E10       (03130)          LOAD R3,R3SAV
0AB9A A6409E12       (03131)          LOAD R4,R4SAV
0AB9C A6509E14       (03132)          LOAD R5,R5SAV
0AB9E A6609E16       (03133)          LOAD R6,R6SAV
0ABA0 A6709E18       (03134)          LOAD R7,R7SAV
0ABA2 8C50ABAE       (03135)          DJP R5,GENDS0                                   CHECK IF R5 +VE
0ABA4 E0509CBE       (03136)          MOVMR R5,FORFORS                                RELOAD THE COUNTER WITH
                     (03137) ;                                                        44
0ABA6 E2209C86       (03138)          CMPMR R2,POST3S2                                IS R2 GREATER THAN POST
                     (03139) ;                                                        3
0ABA8 8020ABAE       (03140)          JMP GENDS0,GT                                   LEAVE IF GREATER THAN
0ABAA EC209CBE       (03141)          ADDMR R2,EIGTENS                                ADD 18 TO R2
0ABAC EE609CBE       (03142)          SUBMR R6,EIGTENS                                SUBTRACT 18 FROM R6
0ABAE 8C60AB78       (03143) GENDS0   DJP R6,GBITOS1                                  LOOP BACK UNITIL THE ENT
                     (03144) ;                                                        IRE FRAME IS DONE
0ABB0 8000ABEE       (03145)          JMP EXITS
                     (03146) *
                     (03147) *
                     (03148) ;  BIT DESERIALIZATION WITHOUT ERROR CONTROL
                     (03149) *
0ABB2 E0609C89       (03150) BBITOS   MOVMR R6,POST4S                                 MOVE THE FRAME LENGTH TO
0ABB3 3E64           (03151)          SUBRR R6,R2                                     R6=LSEN-1-R2
```

```
0ABB5 0800      (03152)          EVEN
0ABB6 0D40      (03153)          CLR R4                         CLEAR R4
0ABB7 0800      (03154)          EVEN
0ABB8 9C209513  (03155)          ADDIR R2,RECVS-1               SET R2 TO BE THE ADDRESS
                (03156) ;                                        :RECVS(R2)
0ABBA 3022      (03157) WRITOS1  POPXI R2,R1                    POP RECV(R2)-->R1...R2=R
                (03158) ;                                        2+1
0ABBB 2A02      (03159)          SEBCL 0,R1
0ABBC D2089EC4  (03160)          SBB 0,ROTDCTS(R4)              SET LOW BIT IN ROTDCT
0ABBE EE0005B0  (03161)          SBBSL 0,APDNFLS                HAS APDONE HAPPENED?
0ABC0 2021      (03162)          HOP $1+34                      NO, HOP TO EVEN LOC AFTE
                (03163) ;                                        R RET
0ABC1 0800      (03164)          EVEN
0ABC2 CC0005B0  (03165)          MOVZB APDNFLS
0ABC4 E1109E0C  (03166)          STORE R1,R1SAV
0ABC6 E1209E0E  (03167)          STORE R2,R2SAV
0ABC8 E1309E10  (03168)          STORE R3,R3SAV
0ABCA E1409E12  (03169)          STORE R4,R4SAV
0ABCC E1509E14  (03170)          STORE R5,R5SAV
0ABCE E1609E16  (03171)          STORE R6,R6SAV
0ABD0 E1709E18  (03172)          STORE R7,R7SAV
0ABD2 0E70      (03173)          RET
0ABD3 0800      (03174)          EVEN
0ABD4 A6109E0C  (03175)          LOAD R1,R1SAV
0ABD6 A6209E0E  (03176)          LOAD R2,R2SAV
0ABD8 A6309E10  (03177)          LOAD R3,R3SAV
0ABDA A6409E12  (03178)          LOAD R4,R4SAV
0ABDC A6509E14  (03179)          LOAD R5,R5SAV
0ABDE A6609E16  (03180)          LOAD R6,R6SAV
0ABE0 A6709E18  (03181)          LOAD R7,R7SAV
0ABE2 2641      (03182)          INCR R4,1                      INCREMENT R4 BY 1
0ABE3 0800      (03183)          EVEN
0ABE4 8C60ABBA  (03184)          DJP R6,WRITOS1                 LOOP BACK UNITIL THE ENT
                (03185) ;                                        IRE FRAME IS DONE
                (03186) EXITS    EVEN
0ABE6 80009E60  (03187)          JMP RECVSRA
                (03188)          EJECT
```

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                     (03189) LGROES   EVEN
0ABE6 DE000571 (03190)          SMBSL 0,OUTFUL
0ABEA 80009E7E (03191)          JMP LOBSRA1                      WAIT TIL AP OUT BUFF FUL
                     (03192) ;                                   L
0ABEC E802056A (03193)          MOVLM 1,OUTS                     CLEAR D/A INTERRUPT FLAG
0ABEE E849EECE (03194)          MOVLM SETSGO,SYSFLGS
0ABF0 0260     (03195)          CCS 3                            FROM SRB=2...
0ABF1 06A0     (03196)          SCS 2                            TO SRB=1
0ABF2 02C0     (03197)          CCS 4                            FROM MRB=1...
0ABF3 0600     (03198)          SCS 5                            TO MRB=2
0ABF4 DE000580 (03199)          SMBSL 0,APDNFLS                  HAS APDONE HAPPENED?
0ABF6 2005     (03200)          HOP #L+6
0ABF7 0800     (03201)          EVEN
0ABF8 CC000580 (03202)          MOVZM APDNFLS
0ABFA 0E70     (03203)          RET
0ABFB 0800     (03204)          EVEN
0ABFC E2000578 (03205)          CMPMZ RSYN
0ABFE 8120AC06 (03206)          JMP LOZS,LE                      OUTPUT SILENCE IF NO SYN
                     (03207) ;                                   C
0AC00 E2000579 (03208)          CMPMZ NEWSYN
0AC02 8130AC32 (03209)          JMP LOPS,GE                      OUTPUT SPEECH IS WE'VE W
                     (03210) ;                                   AITED LONG ENUFF
0AC04 E5000579 (03211)          INCM NEWSYN                      COUNT THIS AS ONE MORE F
                     (03212) ;                                   RAME WAITED
0AC06 9040003D (03213) LOZS     MOVIR R4,BLTH1-1
0AC08 90209202 (03214)          MOVIR R2,ZEOS-1
0AC0A E200056B (03215)          CMPMZ OFLGS
0AC0C 8010AC20 (03216)          JMP LOZ1S,EQ
0AC0E D7281102 (03217)          BMOVEL R2,R4,NOUT2S              LOAD BUFFER #2 IF OFLG S
                     (03218) ;                                   ET
0AC10 DE000580 (03219)          SMBSL 0,APDNFLS
0AC12 2005     (03220)          HOP #L+6
0AC13 0800     (03221)          EVEN
0AC14 CC000580 (03222)          MOVZM APDNFLS
0AC16 0E70     (03223)          RET
0AC17 0800     (03224)          EVEN
0AC18 9040003D (03225)          MOVIR R4,BLTH1-1
0AC1A 90209202 (03226)          MOVIR R2,ZEOS-1
0AC1C D728117E (03227)          BMOVEL R2,R4,NOUT2S+BLTH12
0AC1E 8000AC5C (03228)          JMP GTIOLSS
0AC20 D728100C (03229) LOZ1S    BMOVEL R2,R4,NOUT1S              LOAD BUFFER #1
0AC22 DE000580 (03230)          SMBSL 0,APDNFLS
0AC24 2005     (03231)          HOP #L+6
0AC25 0800     (03232)          EVEN
```

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0AC26 CC000580 (03233)          MOVZM APDNFLS
0AC28 0E70     (03234)          RET
0AC29 0800     (03235)          EVEN
0AC2A 9040003C (03236)          MOVIR R4,BLTH1-1
0AC2C 90209202 (03237)          MOVIR R2,ZROS-1
0AC2E D728108B (03238)          BMOVEL R2,R4,NOUT1S+BLTH12
0AC30 8000AC5C (03239)          JMP GTIOLSS
0AC32 9040003C (03240) LOBS     MOVIR R4,BLTH1-1
0AC34 96209442 (03241)          MOVIR R2,OUTBS-2                 'PREPARE FOR BLOCK MOVE
0AC36 E2000568 (03242)          CMPBZ OFLGS                      EXAMINE OFLG
0AC38 8010AC4C (03243)          JMP FL20S,E0                     IF OFLG=0, GOTO FL20
0AC3A D7281102 (03244)          BMOVEL R2,R4,NOUT2S
0AC3C DE000580 (03245)          SMBSL 0,APDNFLS                  HAS APDONE HAPPENED?
0AC3E 2005     (03246)          BOP #L+6
0AC3F 0800     (03247)          EVEN
0AC40 CC000580 (03248)          MOVZM APDNFLS
0AC42 0E70     (03249)          RET
0AC43 0800     (03250)          EVEN
0AC44 962094BE (03251)          MOVIR R2,OUTBS-2+BLTH12
0AC46 9040003C (03252)          MOVIR R4,BLTH1-2
0AC48 D728117E (03253)          BMOVEL R2,R4,NOUT2S+BLTH12
0AC4A 8000AC5C (03254)          JMP GTIOLSS
               (03255) ;
               (03256) ;
0AC4C D728100C (03257) FL20S    BMOVEL R2,R4,NOUT1S
0AC4E DE000580 (03258)          SMBSL 0,APDNFLS                  HAS APDONE HAPPENED?
0AC50 2005     (03259)          BOP #L+6
0AC51 0800     (03260)          EVEN
0AC52 CC000580 (03261)          MOVZM APDNFLS
0AC54 0E70     (03262)          RET
0AC55 0800     (03263)          EVEN
0AC56 902094EE (03264)          MOVIR R2,OUTBS-2+BLTH12
0AC58 9040003C (03265)          MOVIR R4,BLTH1-2
0AC5A D728108B (03266)          BMOVEL R2,R4,NOUT1S+BLTH12
               (03267) ;
               (03268) ;
               (03269) GTIOLSS EVEN
0AC5C 0200     (03270)          CCS 5                            FROM MRB=2...
0AC5D 06C0     (03271)          SCS 4                            TO MRB=1
0AC5E EB09EECE (03272)          MOVLM CLRSCO,SYSFLGS
0AC60 80009E7C (03273)          JMP LOBUSRA                      GO BACK TO DISPATCHER
               (03274) *  DEFINE GLOBAL SYMBOLS
      000049E2 (03275)          D16SS1=$49E2
      00004A00 (03276)          D16SS2=$4A00
```

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        00004ACA (03277)          D22SS1=$4ACA
        00004AFF (03278)          E23SS1=$4AFF
        00004B12 (03279)          IOSSINT=$4B12
                 (03280) *
                 (03281) *A/D,D/A,MODEM INTERRUPT SERVICE RTNS
0AC62 CC000566 (03282) SENS1F  MOVZM ISAS100                      ANA=0
0AC64 CC000567 (03283)         MOVZM ISAS101                      AFLG=0
0AC66 80004B12 (03284)         JMP IOSSINT
0AC68 CC000566 (03285) SENS2F  MOVZM ISAS100                      ANA=0
0AC6A F0500503 (03286)         MOVMR R5,ISAS01
0AC6C F0500567 (03287)         MOVRM R5,ISAS101                   AFLG=1
0AC6E 80004B12 (03288)         JMP IOSSINT
0AC70 CC000568 (03289) RCVRS1F MOVZM ISAS102                      SYN=0
0AC72 CC000569 (03290)         MOVZM ISAS103                      SFLG=0
0AC74 90101IFF (03291)         MOVIR R1,RECV1S
0AC76 F200057B (03292)         CMRMZ ESYN
0AC78 2000     (03293)         NOP
0AC79 1620     (03294)         SKPL LE
0AC7A 8600A62F (03295)         CALL R0,SUPDAT                     DO SYNC UPDATE
0AC7C 80004B12 (03296)         JMP IOSSINT
0AC7E CC000568 (03297) RCVRS2F MOVZM ISAS102                      SYN=0
0AC80 F0500503 (03298)         MOVMR R5,ISAS01
0AC82 F0500569 (03299)         MOVRM R5,ISAS103                   SFLG=1
0AC84 90101369 (03300)         MOVIR R1,RECV2S
0AC86 F200057B (03301)         CMRMZ ESYN
0AC88 2000     (03302)         NOP
0AC89 1620     (03303)         SKPL LE
0AC8A 8600A62F (03304)         CALL R0,SUPDAT                     DO SYNC UPDATE
0AC8C 80004B12 (03305)         JMP IOSSINT
0AC8E CC00056A (03306) OUTS1F  MOVZM ISAS104                      OUT=0
0AC90 CC00056B (03307)         MOVZM ISAS105                      OFLG=0
0AC92 80004B12 (03308)         JMP IOSSINT
0AC94 CC00056A (03309) OUTS2F  MOVZM ISAS104                      OUT=0
0AC96 F0500503 (03310)         MOVMR R5,ISAS01
0AC98 F050056B (03311)         MOVRM R5,ISAS105                   OFLG=1
0AC9A 80004B12 (03312)         JMP IOSSINT
0AC9C CC00056C (03313) INS1F   MOVZM ISAS106                      INP=0
0AC9E CC00056D (03314)         MOVZM ISAS107                      IFLG=0
0ACA0 80004B12 (03315)         JMP IOSSINT
0ACA2 CC00056C (03316) INS2F   MOVZM ISAS106                      INP=0
0ACA4 F0500503 (03317)         MOVMR R5,ISAS01
0ACA6 F050056D (03318)         MOVRM R5,ISAS107                   IFLG=1
0ACA8 80004B12 (03319)         JMP IOSSINT
               (03320) *
```

```
                      (03321) *  LINE SIDE OUTPUT
        000049F2 (03322)         #L=D16SS1
049F2 90700000 (03323) D16ST1  MOVIR R7,0
049F4 8600AC62 (03324)         CALL R0,SENS1F
049F6 0F70     (03325)         RET
049F7 0800     (03326)         EVEN
049F8 90700001 (03327)         MOVIR R7,1
049FA 8600AC68 (03328)         CALL R0,SENS2F
049FC 0F70     (03329)         RET
049FD 0800     (03330)         EVEN
049FE 800049F2 (03331)         JMP D16ST1
                      (03332) *
                      (03333) *  LINE SIDE INPUT
        00004A00 (03334)         #L=D16SS2
04A00 90700010 (03335) D16ST2  MOVIR R7,16
04A02 8600AC70 (03336)         CALL R0,RCVRS1F
04A04 0F70     (03337)         RET
04A05 0800     (03338)         EVEN
04A06 90700011 (03339)         MOVIR R7,17
04A08 8600AC7F (03340)         CALL R0,RCVRS2F
04A0A 0F70     (03341)         RET
04A0B 0800     (03342)         EVEN
04A0C 80004A00 (03343)         JMP D16ST2
                      (03344) *
                      (03345) *  SPEECH SIDE OUTPUT
        00004ACA (03346)         #L=D22SS1
04ACA 9070000C (03347) D22ST1  MOVIR R7,12
04ACC 8600ACBF (03348)         CALL R0,OUTS1F
04ACE 0F70     (03349)         RET
04ACF 0800     (03350)         EVEN
04AD0 9070000D (03351)         MOVIR R7,13
04AD2 8600AC94 (03352)         CALL R0,OUTS2F
04AD4 0F70     (03353)         RET
04AD5 0800     (03354)         EVEN
04AD6 80004ACA (03355)         JMP D22ST1
                      (03356) *
                      (03357) *  SPEECH SIDE INPUT
        00004AEE (03358)         #L=D23SS1
04AEE 9070000E (03359) D23ST1  MOVIR R7,14
04AF0 8600AC9C (03360)         CALL R0,INS1F
04AF2 0F70     (03361)         RET
04AF3 0800     (03362)         EVEN
04AF4 9070000F (03363)         MOVIR R7,15
04AF6 8600ACA2 (03364)         CALL R0,INS2F
```

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04AF8 0F70        (03365)         RET
04AF9 0800        (03366)         EVEN
04AFA 80004AFF    (03367)         JMP D23S11
                  (03368) *
                  (03369) *  PATCH EXECUTIVE TO CREATE BINARY VALUED I/O FLAGS
04AFC 80004B12    (03370)         JMP IOSSINT
                  (03371)         EJECT
```

```
ACOTH:     0000A (01968) (02668)
AFDTSORG:  008EB (00010)
AFLGS:     00567 (00079) (01597) (01606) (01683)
ANAS:      00566 (00077) (00824)
APONFLS:   00580 (00099) (00697) (00700) (00706) (00709) (00715) (00718) (00723) (00726) (00733)
                 (00736) (00747) (00750) (00756) (00759) (00764) (00767) (00844) (00847) (00856)
                 (00859) (00876) (00880) (00908) (00912) (00936) (00940) (01014) (01018) (01086)
                 (01090) (01129) (01133) (01156) (01160) (01201) (01205) (01228) (01232) (01271)
                 (01275) (01303) (01307) (01348) (01352) (01391) (01395) (01439) (01443) (01479)
                 (01483) (01576) (01580) (01613) (01617) (01638) (01642) (01662) (01666) (01688)
                 (01692) (01712) (01716) (01736) (01740) (01804) (01808) (01828) (01832) (01852)
                 (01856) (01879) (01882) (01888) (01891) (01897) (01900) (01908) (01911) (01918)
                 (01921) (01927) (01930) (01936) (01939) (02015) (02019) (02162) (02166) (02185)
                 (02189) (02208) (02212) (02231) (02235) (02254) (02258) (02277) (02281) (02306)
                 (02310) (02341) (02345) (02368) (02372) (02435) (02439) (02586) (02590) (02618)
                 (02622) (02716) (02720) (02783) (02787) (02812) (02816) (02856) (02860) (02883)
                 (02887) (02927) (02931) (02954) (02958) (02998) (03002) (03028) (03032) (03073)
                 (03077) (03114) (03118) (03161) (03165) (03199) (03202) (03219) (03222) (03230)
                 (03233) (03245) (03248) (03258) (03261)
BARS:      09C95 (00223)
BCH24S:    0A8CF (02566) (02572)
BCH25S:    0A8FF (02556) (02560) (02572)
BCHP0S:    0A758 (02299) (02302)
BCHP1S:    0A75C (02306)
BCHP2S:    0A786 (02332) (02365)
BCHP3S:    0A792 (02333) (02341)
BCHP4S:    0A87F (02502) (02509)
BCHP5S:    0A86A (02489) (02494) (02509)
BCHPAS:    0A894 (02393) (02522) (02544) (02573)
BCHPBS:    0A8AA (02418) (02546)
BCHPCS:    0A8B0 (02480) (02549) (02550)
BCHPDS:    0A8A6 (02513) (02543)
BCHPSS:    0A800 (02398) (02416)
BCHPTS:    0A816 (02426) (02435)
BCHPUS:    0A858 (02458) (02469) (02478)
BCHF0S:    0A2FF (01473) (01476)
BCHF1S:    0A2F0 (01478)
BCHF2S:    0A318 (01503) (01513)
BCHF3S:    0A320 (01504) (01510)
BF1S:      08F80 (00169) (01878) (01887) (01896) (01904) (01955) (02154)
BF2S:      08FF1 (00171) (01800) (01803) (01827) (01851) (01959) (02157)
BF3S:      09162 (00173) (01907) (01917) (01926) (01935)
BIT0S:     0A088 (00195) (00996)
BIT1S:     0A084 (00195) (00195) (00989)
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BIT2S:      0A680 (00196) (00196) (00982)
BIT3S:      0A07C (00196) (00196) (00975)
BIT4S:      0A078 (00195) (00195) (00196) (00196) (00968)
BIT5S:      0A074 (00195) (00961)
BLTH:       000F6 (00062)
BLTH1:      0004F (00068) (00838) (00851) (00863) (03213) (03225) (03236) (03240) (03252) (03265)
BLTH12:     0007C (00069) (00850) (00852) (00862) (00864) (03227) (03238) (03251) (03253) (03264)
                  (03266)
BUS2:       0A654 (02113) (02145)
CLRSG0:     00004 (00015) (00742) (02715) (03272)
CLRSG2:     00006 (00016)
CLRSG3:     00007 (00017) (00704) (00867)
CPTP1S:     09F88 (00778) (01119) (01190) (01262) (01337) (02846) (02917) (02988) (03062)
CSPUSNOS:   021FC (00011)
CS*SP24:    09F1A (00107) (00689)
CS*SSTD6:   00405 (00014) (00689)
D16ST1:     049F2 (03323) (03331)
D16ST2:     04A00 (03335) (03343)
D16SS1:     049F2 (03275) (03322)
D16SS2:     04A00 (03276) (03334)
D22ST1:     04ACA (03347) (03355)
D22SS1:     04ACA (03277) (03346)
D23ST1:     04AFE (03359) (03367)
D23SS1:     04AFE (03278) (03358)
DBIT0S:     0A242 (00198) (01301) (01344)
DBIT0S1:    0A278 (01383) (01421)
DBIT1S:     0A1DC (00198) (01227) (01270)
DBIT1S1:    0A208 (01299) (01332) (01339)
DBIT2S:     0A176 (00198) (01155) (01198)
DBIT2S1:    0A1A2 (01225) (01257) (01264)
DBIT3S:     0A110 (00198) (01083) (01127)
DBIT3S1:    0A13C (01153) (01185) (01192)
DBIT4S:     0A0D2 (00198) (01078)
DBIT4S1:    0A0D6 (01081) (01114) (01121)
DMYS:       00794 (00022)
DSGDS:      0A966 (02716) (02739)
DSGD1S:     0A9A0 (02755) (02759)
DSRBUFS:    0A8D4 (02533) (02578) (02581)
EBIT0S:     0A2B2 (01370) (01428)
EBIT0S1:    0A2BC (01436) (01465)
EIGTENS:    09C8E (00216) (00778) (01035) (01419) (01420) (02683) (03141) (03142)
ENDS0:      0A2AE (01413) (01418) (01421)
ENDDCS:     0A807 (02538) (02577)
ENDECS:     0A35C (01565)
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FMDSES:     0A2E8 (01068) (01128) (01200) (01293) (01346) (01423) (01467)
FERS:       09C91 (00219) (00785) (00789) (00799) (00803)
FRRSREN:    09E9F (00801) (00804) (00806)
FRRSRET:    09E92 (00787) (00791) (00793)
FRR1S:      09E8A (00785)
FRR2S:      09E8E (00789)
FRR3S:      09E96 (00799)
FRR4S:      09E9A (00803)
FRSYN:      0057C (00047) (02076) (02122) (02132)
EXITS:      0A8E6 (02774) (02855) (02926) (02997) (03071) (03145) (03186)
FRIT0S:     0A94A (00200) (02671)
FRIT1S:     0A944 (00200) (00200) (02665)
FRIT2S:     0A93E (00201) (00201) (02659)
FRIT3S:     0A938 (00201) (00201) (02653)
FRIT4S:     0A932 (00200) (00200) (00201) (00201) (02647)
FRIT5S:     0A92C (00200) (02641)
FL11S:      0A530 (01797) (01877)
FL12S:      0A592 (01874) (01942)
FL16S:      0A662 (02153) (02157)
FL17S:      0A664 (02156) (02159)
FL20S:      0AC4C (03243) (03257)
FLRS:       09EE0 (00841) (00854)
FLR1S:      09EE2 (00853) (00865)
FL9S:       0A414 (01608) (01685)
FORFOPS:    09C8F (00217) (01053) (01115) (01186) (01258) (01333) (01414) (02760) (02842) (02913)
                  (02984) (03058) (03136)
FRPLNGS:    09C88 (00213)
FRSTF:      09C84 (00205) (02081) (02754) (02757)
GRIT0S:     0AB44 (00203) (03026) (03069)
GRIT0S1:    0AB78 (03107) (03143)
GRIT1S:     0AAGF (00203) (02953) (02996)
GRIT1S1:    0AB0A (03024) (03057) (03064)
GRIT2S:     0AA78 (00203) (02882) (02925)
GRIT2S1:    0AAA4 (02951) (02983) (02990)
GRIT3S:     0AA12 (00203) (02809) (02854)
GRIT3S1:    0AA3E (02880) (02912) (02919)
GRIT4S:     0A9B0 (00203) (02763)
GRIT4S1:    0A9DB (02807) (02841) (02848)
GENDS0:     0ABAF (03135) (03140) (03143)
GTIOENS:    09E0B (00675)
GTIOLSS:    0AC5C (00675) (03228) (03239) (03254) (03269)
GTIOSTS:    09E0A (00674)
HS:         00001 (00050) (01775)
HRIT0S:     0AB02 (03095) (03150)
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HEITOS1:    0A66A (03157) (03184)
IGITS:      0866F (00163) (01056) (01078) (01081) (01150) (01153) (01222) (01225) (01294) (01299)
IDEVS24:    0001B (00012) (00110) (00122) (00123)
IDWSRD:     00061 (01966) (02036) (02066) (02136)
IFLGS:      0056D (00086) (00840)
ILVLS1:     00001 (00013) (00110) (00122) (00123)
INS1F:      0AC9C (03313) (03360)
INS2F:      0ACA2 (03316) (03364)
INDX1S:     09C40 (00195) (00957)
INDX2S:     09C58 (00198) (01071)
INDX4S:     09C62 (00200) (02639)
INDX5S:     09C7A (00203) (02777)
INFULL:     00570 (00095) (00691) (00722) (00829)
INITS:      00573 (00098) (00793) (00806)
INPS:       0056C (00085) (00712) (00833)
INPBS:      08D80 (00167) (00843) (00852) (00855) (00864)
IODSP1S:    09F21 (00693)
IODSPTS:    09F1C (00674) (00689) (00690)
IOSSINT:    04B12 (03279) (03284) (03288) (03296) (03305) (03308) (03312) (03315) (03319) (03370)
ISAS01:     00563 (00024) (03286) (03298) (03310) (03317)
ISAS100:    00566 (00025) (00077) (03282) (03285)
ISAS101:    00567 (00026) (00079) (03283) (03287)
ISAS102:    00568 (00027) (00081) (03289) (03297)
ISAS103:    00569 (00028) (00082) (03290) (03299)
ISAS104:    0056A (00029) (00083) (03306) (03309)
ISAS105:    0056B (00030) (00084) (03307) (03311)
ISAS106:    0056C (00031) (00085) (03313) (03316)
ISAS107:    0056D (00032) (00086) (03314) (03318)
ISAS108:    0056E (00033) (00093)
ISAS109:    0056F (00034) (00094)
ISAS110:    00570 (00035) (00095)
ISAS111:    00571 (00036) (00096)
ISAS112:    00572 (00037) (00097)
ISAS113:    00573 (00038) (00098)
ISAS127:    00581 (00048) (00087)
ISVTS:      00502 (00023) (00024) (00025) (00026) (00027) (00028) (00029) (00030) (00031) (00032)
                  (00033) (00034) (00035) (00036) (00037) (00038) (00039) (00040) (00041) (00042)
                  (00043) (00044) (00045) (00046) (00047) (00048)
KOUNTS:     00572 (00097)
LOBS:       0AC32 (03209) (03240)
LOBSRA1:    09F7E (00764) (03191)
LOBUSRA:    09F7C (00763) (03273)
LOBUFS:     0AFEB (00755) (03189)
LODATS:     0A35F (01566) (01571)
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LOOES:     0A04C (00933) (01  5)
LOOPS1:    0A904 (02616) (02680)
LOZS:      0AC66 (03206) (03213)
LOZ1S:     0AC20 (03216) (03229)
LPARM:     0000D (00066) (00214) (00214)
LSEN:      00171 (00065) (00211) (01904) (01907)
LSEN1:     0003F (00070) (00898) (00901) (00902) (00904) (00905) (01605) (01635) (01660) (01710)
                 (01734) (02160) (02183) (02184) (02206) (02207) (02229) (02230) (02252) (02253)
                 (02275) (02276)
LSEN12:    0007C (00071) (01634) (01636) (01659) (01661) (01709) (01711) (01733) (01735)
LSEN2:     0003P (00072) (01795) (01826) (01850) (01866) (01895) (01916) (01925) (01934)
LSEN22:    0007A (00073) (01825) (01827) (01874) (01851) (01885) (01887) (01894) (01896) (01903)
                 (01924) (01926) (01933) (01935)
LSTER:     0057B (00046) (02083) (02119) (02124) (02131)
LSTOR:     00004 (01967) (02075) (02121)
LTH:       00100 (00063) (00213) (02751)
LTH1:      00640 (00064)
MS:        00060 (00051)
MSS:       00000 (00052)
MASKS:     09CBE (00215)
MBLIH:     00171 (01969) (01980) (01993) (02011)
MOVSPA1:   09F4A (00723) (00830)
MOVES:     09FAA (00714) (00829)
MOVESP:    0A49C (01781)
MOVESPA:   09F4B (00722) (00868)
NESS:      09FFC (00659) (02304) (02482) (02492) (02508) (02511) (02516) (02518) (02520) (02522)
                 (02525) (02529) (02543) (02546) (02550)
NESTS:     09FFB (00658) (02395) (02491) (02504) (02507) (02512)
NEWMAX:    0A5FB (02044)
NEWSYN:    00579 (00044) (02079) (03208) (03211)
NIN1S:     00D2A (00131) (00854) (00862)
NIN2S:     00F20 (00133) (00842) (00F50)
NOMAX:     0A5FF (02043) (02053)
NOUT1S:    0100C (00135) (03229) (03238) (03257) (03266)
NOUT2S:    01102 (00137) (03217) (03227) (03244) (03253)
OFLGS:     00568 (00084) (03215) (03242)
OLSYN:     0057A (00045) (02088) (02115) (02138)
ONES:      09C90 (00218) (01382) (01435)
OUTS:      0056A (00083) (00753) (03193)
OUTS1F:    0AC8F (03306) (03348)
OUTS2F:    0AC94 (03309) (03352)
OUTBS:     09444 (00178) (03241) (03251) (03264)
OUTFUL:    00571 (00096) (00692) (00763) (03190)
PARMSP2:   09CBC (00214) (00933) (02613)
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POST2S:     09CB5 (00207)
POST3S:     09CB6 (00208) (01117) (01186) (01260) (01335) (01369) (02844) (02915) (02986) (03060)
                  (03094)
POST3S1:    09CB7 (00209) (01416)
POST3S2:    09CB8 (00210) (03138)
POST4S:     09CB9 (00211) (01127) (01199) (01292) (01344) (01375) (01428) (02854) (02925) (02996)
                  (03069) (03100) (03150)
QPES:       08A00 (00153) (00934) (01036) (01041)
QTDCS:      08A09 (00156)
QTDCTS:     08A0F (00161) (01107) (01178) (01250) (01325) (01378) (01431)
QTGS:       08A0C (00159)
QTMS:       08A0A (00157)
QTPARS:     08A00 (00154)
QTVS:       08A0E (00158)
QIVAR:      08A08 (00155)
R1SAV:      09F0C (00676) (00881) (00890) (00913) (00922) (00941) (00950) (01019) (01028) (01091)
                  (01100) (01134) (01143) (01161) (01170) (01206) (01215) (01233) (01242) (01276)
                  (01285) (01308) (01317) (01353) (01362) (01396) (01405) (01444) (01453) (01484)
                  (01493) (01581) (01590) (01618) (01627) (01643) (01652) (01667) (01676) (01693)
                  (01702) (01717) (01726) (01741) (01750) (01809) (01818) (01833) (01842) (01857)
                  (01866) (02020) (02029) (02167) (02176) (02190) (02199) (02213) (02222) (02236)
                  (02245) (02259) (02268) (02282) (02291) (02311) (02320) (02346) (02355) (02373)
                  (02382) (02440) (02449) (02591) (02600) (02623) (02632) (02721) (02730) (02788)
                  (02797) (02817) (02826) (02861) (02870) (02888) (02897) (02932) (02941) (02959)
                  (02968) (03003) (03012) (03033) (03042) (03078) (03087) (03119) (03128) (03166)
                  (03175)
R2SAV:      09F0E (00677) (00882) (00891) (00914) (00923) (00942) (00951) (01020) (01029) (01092)
                  (01101) (01135) (01144) (01162) (01171) (01207) (01216) (01234) (01243) (01277)
                  (01286) (01309) (01318) (01354) (01363) (01397) (01406) (01445) (01454) (01485)
                  (01494) (01582) (01591) (01619) (01628) (01644) (01653) (01668) (01677) (01694)
                  (01703) (01718) (01727) (01742) (01751) (01810) (01819) (01834) (01843) (01858)
                  (01867) (02021) (02030) (02168) (02177) (02191) (02200) (02214) (02223) (02237)
                  (02246) (02260) (02269) (02283) (02292) (02312) (02321) (02347) (02356) (02374)
                  (02383) (02441) (02450) (02592) (02601) (02624) (02633) (02722) (02731) (02789)
                  (02798) (02818) (02827) (02862) (02871) (02889) (02898) (02933) (02942) (02960)
                  (02969) (03004) (03013) (03034) (03043) (03079) (03088) (03120) (03129) (03167)
                  (03176)
R3SAV:      09F10 (00678) (00883) (00892) (00915) (00924) (00943) (00952) (01021) (01030) (01093)
                  (01102) (01136) (01145) (01163) (01172) (01208) (01217) (01235) (01244) (01278)
                  (01287) (01310) (01319) (01355) (01364) (01398) (01407) (01446) (01455) (01486)
                  (01495) (01583) (01592) (01620) (01629) (01645) (01654) (01669) (01678) (01695)
                  (01704) (01719) (01728) (01743) (01752) (01811) (01820) (01835) (01844) (01859)
                  (01868) (02022) (02031) (02169) (02178) (02192) (02201) (02215) (02224) (02238)
                  (02247) (02261) (02270) (02284) (02293) (02313) (02322) (02348) (02357) (02375)
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              (02383) (02442) (02451) (02593) (02602) (02625) (02634) (02723) (02742) (02790)
              (02799) (02819) (02828) (02863) (02872) (02890) (02899) (02934) (02943) (02961)
              (02970) (03005) (03014) (03035) (03044) (03080) (03089) (03121) (03130) (03168)
              (03177)
R4SAV:  09F12 (00879) (00883) (00893) (00916) (00925) (00944) (00953) (01022) (01031) (01094)
              (01103) (01137) (01146) (01164) (01173) (01209) (01218) (01236) (01245) (01279)
              (01288) (01311) (01320) (01356) (01365) (01399) (01408) (01447) (01456) (01487)
              (01496) (01584) (01593) (01621) (01630) (01646) (01655) (01670) (01679) (01696)
              (01705) (01720) (01729) (01744) (01753) (01812) (01821) (01836) (01845) (01860)
              (01869) (02023) (02032) (02170) (02179) (02193) (02202) (02216) (02225) (02239)
              (02248) (02262) (02271) (02285) (02294) (02314) (02323) (02349) (02358) (02376)
              (02385) (02443) (02452) (02594) (02603) (02626) (02635) (02724) (02733) (02750)
              (02759) (02791) (02800) (02820) (02829) (02864) (02873) (02891) (02900) (02935)
              (02943) (02962) (02971) (03006) (03015) (03036) (03045) (03081) (03090) (03122)
              (03131) (03169) (03178)
R5SAV:  09F11 (00880) (00885) (00894) (00917) (00926) (00945) (00954) (01023) (01032) (01095)
              (01101) (01138) (01147) (01165) (01174) (01210) (01219) (01237) (01246) (01280)
              (01289) (01312) (01321) (01357) (01366) (01400) (01409) (01448) (01457) (01488)
              (01497) (01585) (01594) (01622) (01631) (01647) (01656) (01671) (01680) (01697)
              (01706) (01721) (01730) (01745) (01754) (01813) (01822) (01837) (01846) (01861)
              (01870) (02024) (02033) (02171) (02180) (02194) (02203) (02217) (02226) (02240)
              (02249) (02263) (02272) (02286) (02295) (02315) (02324) (02350) (02359) (02377)
              (02386) (02444) (02453) (02595) (02604) (02627) (02636) (02725) (02734) (02792)
              (02801) (02821) (02830) (02865) (02874) (02892) (02901) (02936) (02945) (02963)
              (02972) (03007) (03016) (03037) (03046) (03082) (03091) (03123) (03132) (03170)
              (03179)
R6SAV:  09F16 (00881) (00886) (00895) (00918) (00927) (00946) (00955) (01024) (01033) (01096)
              (01105) (01139) (01148) (01166) (01175) (01211) (01220) (01238) (01247) (01281)
              (01290) (01313) (01322) (01358) (01367) (01401) .01410) (01449) (01458) (01489)
              (01498) (01586) (01595) (01623) (01632) (01648) (01657) (01672) (01681) (01698)
              (01707) (01722) (01731) (01746) (01755) (01814) (01823) (01838) (01847) (01862)
              (01871) (02025) (02034) (02172) (02181) (02195) (02204) (02218) (02227) (02241)
              (02250) (02264) (02273) (02287) (02296) (02316) (02325) (02351) (02360) (02378)
              (02387) (02445) (02454) (02596) (02605) (02628) (02637) (02726) (02735) (02793)
              (02802) (02822) (02831) (02866) (02875) (02893) (02902) (02937) (02946) (02964)
              (02973) (03008) (03017) (03038) (03047) (03083) (03092) (03124) (03133) (03171)
              (03180)
R7SAV:  09F18 (00882) (00887) (00896) (00919) (00928) (00947) (00956) (01025) (01034) (01097)
              (01106) (01140) (01149) (01167) (01176) (01212) (01221) (01239) (01248) (01282)
              (01291) (01314) (01323) (01359) (01368) (01402) (01411) (01450) (01459) (01490)
              (01499) (01567) (01596) (01624) (01633) (01649) (01658) (01673) (01682) (01699)
              (01708) (01723) (01732) (01747) (01756) (01815) (01824) (01839) (01848) (01863)
              (01872) (02026) (02035) (02173) (02182) (02196) (02205) (02219) (02228) (02242)
              (02251) (02265) (02274) (02288) (02297) (02317) (02326) (02352) (02361) (02379)
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                   (02388) (02446) (02455) (02597) (02606) (02629) (02638) (02727) (02736) (02794)
                   (02803) (02823) (02832) (02867) (02876) (02894) (02903) (02938) (02947) (02965)
                   (02974) (03009) (03018) (03039) (03048) (03084) (03093) (03125) (03134) (03172)
                   (03181)
RCVOFF:     00561 (00067) (00746) (01775)
RCVFSTF:    0AC70 (03289) (03336)
RCVRSZF:    0AC7F (03297) (03340)
RDATAS:     0056F (00093) (01787) (01792) (01796) (01957) (02152)
RECVS:      09544 (00160) (00210) (02161) (02184) (02207) (02230) (02253) (02276) (02332) (02517)
                  (02519) (02521) (02559) (02571) (02641) (02647) (02653) (02659) (02665) (02671)
                  (02687) (02693) (02833) (02904) (02975) (03049) (03105) (03155)
RECVSRA:    09E60 (00741) (00807) (01974) (02089) (02094) (02758) (03187)
RECV1S:     011F8 (00139) (01877) (01885) (01894) (01903) (01914) (01924) (01933) (03291)
RECV2S:     01369 (00141) (01799) (01825) (01849) (03300)
REGS:       09E01 (00662)
RGO:        00574 (00039) (00729) (01774)
RGO2:       00576 (00041) (02737) (02740)
RINITS:     09AA6 (00192) (02763) (02804) (02807) (02877) (02880) (02948) (02951) (03019) (03024)
RMISES:     0A5A4 (01963) (01971)
RMISSIN:    0A5A8 (01974)
RMISSE:     0A5AC (01964) (01975)
ROFHS:      09686 (00182) (02616) (02642) (02648) (02654) (02660) (02666) (02672) (02686) (02688)
                  (02693)
ROTDCTS:    096C4 (00184) (02752) (02835) (02906) (02977) (03051) (03110) (03160)
RSSPE:      09935 (00190) (01965) (02038) (02060)
RSSSS:      097C4 (00187) (01991) (01992) (01994) (02040) (02042) (02044) (02059)
RSYN:       0057B (00043) (01960) (01972) (01989) (02072) (02092) (02142) (03205) (03292) (03301)
S1SPS:      09F00 (00661) (02406) (02428)
SAS11:      0039A (00055)
SAVES:      09C92 (00220)
SCDS19:     00DFE (00118) (00124)
SCHKS:      0A594 (01955)
SCHK1S:     0A59C (01958) (01960)
SENS:       0BC0F (00165) (00209) (00899) (00902) (00905) (00963) (00970) (00977) (00984) (00991)
                  (00998) (01037) (01043) (01108) (01179) (01251) (01326) (01380) (01433) (01503)
                  (01520) (01522) (01524) (01526) (01528) (01530) (01532) (01534) (01536) (01538)
                  (01540) (01542) (01544) (01546) (01548) (01550) (01552) (01554) (01604) (01610)
                  (01634) (01659) (01685) (01709) (01733)
SENS1F:     0AC62 (03282) (03324)
SENS2F:     0AC6B (03285) (03328)
SEN1S:      013DC (00113) (01687) (01711) (01735)
SEN2S:      0164F (00145) (01612) (01636) (01661)
SETSG0:     00024 (00018) (01781) (02741) (03194)
SETSG2:     00026 (00019)
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SFISG3:     00027 (00026) (00823) (00F32)
SFLGS:      00569 (00062) (01786)
STSGMO:     0A56A (01991)
STSLP:      0A561 (01984) (01988)
SRBUFS:     09FFB (00826) (00871)
SSSALT:     0A5F2 (02040)
SSSLP:      0A5CB (02015) (02064)
SSSIPT:     0A604 (02050) (02053) (02056) (02060)
SSSNAL:     0A602 (02049) (02059)
SSSNO:      0A62A (02069) (02071) (02092)
START:      08A00 (00053)
SUSFLF:     0A63F (02120) (02124)
SUSFRF:     0A632 (02118) (02129)
SUSIS:      0A650 (02134) (02142)
SUSVAL:     0A64A (02126) (02136)
SUPDAT:     0A62F (02111) (03295) (03304)
SVTS:       00382 (00054) (00055)
SYNS:       0056B (00061) (01778)
SYNB1S:     097C4 (00186) (00187)
SYNB2S:     09935 (00189) (00190)
SYNCS:      00577 (00042) (02074) (02111) (02159)
SYNIN:      0A5AF (01973) (01980)
SYNSP:      0A5C4 (01975) (02011)
SYSFLGS:    1FFCF (00021) (00704) (00742) (00823) (00832) (00867) (01781) (02715) (02741) (03194)
                  (03272)
TRAL1S:     09F38 (00465) (02494) (02560)
TRAL2S:     09F78 (00530) (02496) (02561)
TRAL3S:     09FBB (00594) (02497)
TRENCS:     09CA2 (00224) (01506)
TRPRCS:     09DB9 (00336) (02415) (02434) (02465) (02477)
TRPSMS:     09CFC (00271) (02335) (02338)
TRRPCS:     09DF8 (00400) (02399) (02427) (02459) (02461) (02470)
TRRSLDS:    09C94 (00222)
TRANSRA:    09F30 (00704) (00795) (01760)
TSTS0:      09F22 (00694) (00762) (00770)
TSTS1:      09F3A (00703) (00712)
TSTS2:      09F52 (00721) (00729)
TSTS3:      09FFF (00739) (00753)
UNLS:       09F0F (00843)
UNPFFLS:    0A656 (01965) (02147)
WS:         00002 (00056) (01991) (01994)
XDATAS:     0056F (00094) (01598) (01603)
XGO:        00575 (00040) (00694) (00822)
XMITS:      09FA2 (00695) (00822)
```

```
PAGE    99:        PROG. CSPUSP.TXT

  XMTISE:     03490 (01684) (01757)
  XRECVS:     0A496 (00731) (01774)
  ZS:         00003 (00057)
  Z21S:       09C93 (00221)
  ZEROS:      09CBA (00212)
  ZROS:       09203 (00175) (00897) (00900) (00903) (03214) (03226) (03237)

LINES WITH ERRORS:    0  (MAP VERSION 800101.10)   E=    0
```

3.6.3 Fortran Programs

The modules contained in this section are:

FCBGN
FF2R
VMOV1
VMOV2
VMOV3
MPFDVM
MPDCTM
MPQDPP
MPDQPP
MPMWGX
MPFSTV
MPSSRT
MPIDCM
MPASRT
MPFSTQ
MPFSTD
MPVDNM
MPBASP
MPSCAN
MPCDBA
MASTER
INIT
USER
MAPON
CREATE
DEFINE
SETUP
LOAD
IOSM
AOM
ADAM
SYSTMA
INPUT
DCVAR
DCTF

PITLPC
QDPARM
VPBS
BASIS
ASRT
SDCT
BITA
QDCT
CHANL
DPARM
SSRT
DDCT
DCTR
VARDC
OUTPUT
SNR
TAPE2
OPT1
OPT2
OPT3
OPT4
OPT5
OPT6
OPT7
OPT8
OPT8A (OPT8B and OPT8C are similar)
PREMAP
FILEN

```
0001          INTEGER FUNCTION FCBGN(FCBNO,Y,A,U,B,V,C,W,D,IS)
        C
        C TITLE: FCBGN
        C
        C
        C PURPOSE:
        C      GENERATE FCB AND START EXECUTION OF MAP
        C
        C F4 USAGE:
        C
        C    MAP = FCBGN(FCBNO,Y,A,U,B,V,C,W,D,IS)
        C
        C DESCRIPTION OF PARAMETERS
        C     FCBNO INTEGER VARIABLE SPECIFYING FCB NUMBER
        C     Y,U,V,W - INTEGER VARIABLES SPECIFYING MAP
        C                BUFFER IDENTIFIERS
        C     A,B,C,D - INTEGER VARIABLES SPECIFYING MAP
        C                SCALAR IDENTIFIERS
        C     IS       - POINTER TO LOGICAL ARRAY  SUPPLIED BY BLOCK DATA. K-TH
        C                ELEMENT IS .TRUE. IF K-TH ID ARGUMENT
        C                IS TO BE USED, OTHERWISE .FALSE.
        C     IER      - OPTIONAL ERROR INDICATOR
        C                MAP =0 INDICATES NO ERROR (IDENTIFIERS WITHIN PROPER BOUNDS).
        C                MAP =-K INDICATES K-TH ARGUMENT IN
        C                THE CALLING LIST IS
        C                OUTSIDE LEGAL BOUNDS. MAP EXECUTION ABORTED.
        C
        C
        C FUNCTIONS AND SUBROUTINES REQUIRED
        C     RUNMP(FCBG,FCBS) - INDICATES MAP EXECUTION.
        C
0002          INTEGER Y,A,U,B,V,C,W,D,FCBNO,BIDMN,BIDMX,SIDMN,SIDMX
0003          INTEGER FCBG, FCBS, FCBN2, RUNMP
0004          INTEGER FCBSZ,HWS,FCB,HRI
0005          LOGICAL ISARG
0006          DIMENSION ISARG(8,22)
        C
0007          COMMON/EPZZZ/FCBG(11),FCBSZ(11,7),HWS,FCB(6),MPDCB(4),HRI,LEVEL
0008          DIMENSION FCBS(11)
        C
0009          DATA BIDMN/1/,BIDMX/63/,SIDMN/0/,SIDMX/191/
0010          DATA FCBS/0,10*8/
0011          DATA ISARG(1,1),ISARG(2,1),ISARG(3,1),ISARG(4,1),
             1     ISARG(5,1),ISARG(6,1),ISARG(7,1),ISARG(8,1)/
             2  .FALSE.,.TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,2 * .FALSE./
0012          DATA ISARG(1,2),ISARG(2,2),ISARG(3,2),ISARG(4,2),
             1     ISARG(5,2),ISARG(6,2),ISARG(7,2),ISARG(8,2)/
             2  4*.TRUE.,4*.FALSE./
0013          DATA ISARG(1,3),ISARG(2,3),ISARG(3,3),ISARG(4,3),
             1     ISARG(5,3),ISARG(6,3),ISARG(7,3),ISARG(8,3)/
             2  6*.TRUE.,2*.FALSE./
0014          DATA ISARG(1,4),ISARG(2,4),ISARG(3,4),ISARG(4,4),
             1     ISARG(5,4),ISARG(6,4),ISARG(7,4),ISARG(8,4)/
             2  5*.TRUE.,3*.FALSE./
0015          DATA ISARG(1,5),ISARG(2,5),ISARG(3,5),ISARG(4,5),
             1     ISARG(5,5),ISARG(6,5),ISARG(7,5),ISARG(8,5)/
```

```
              2  3*.TRUE.,5*.FALSE./
0016           DATA ISARG(1,6),ISARG(2,6),ISARG(3,6),ISARG(4,6),
              1     ISARG(5,6),ISARG(6,6),ISARG(7,6),ISARG(8,6)/
              2  .FALSE.,3*.TRUE.,4*.FALSE./
0017           DATA ISARG(1,7),ISARG(2,7),ISARG(3,7),ISARG(4,7),
              1     ISARG(5,7),ISARG(6,7),ISARG(7,7),ISARG(8,7)/
              2  .FALSE.,4*.TRUE.,3*.FALSE./
0018           DATA ISARG(1,8),ISARG(2,8),ISARG(3,8),ISARG(4,8),
              1     ISARG(5,8),ISARG(6,8),ISARG(7,8),ISARG(8,8)/
              2  .TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,3*.FALSE./
0019           DATA ISARG(1,9),ISARG(2,9),ISARG(3,9),ISARG(4,9),
              1     ISARG(5,9),ISARG(6,9),ISARG(7,9),ISARG(8,9)/
              2  3*.TRUE.,.FALSE.,.TRUE.,3*.FALSE./
0020           DATA ISARG(1,10),ISARG(2,10),ISARG(3,10),ISARG(4,10),
              1     ISARG(5,10),ISARG(6,10),ISARG(7,10),ISARG(8,10)/
              2  2*.FALSE.,.TRUE.,5*.FALSE./
0021           DATA ISARG(1,11),ISARG(2,11),ISARG(3,11),ISARG(4,11),
              1     ISARG(5,11),ISARG(6,11),ISARG(7,11),ISARG(8,11)/
              2  .TRUE.,.FALSE.,.TRUE.,5*.FALSE./
0022           DATA ISARG(1,12),ISARG(2,12),ISARG(3,12),ISARG(4,12),
              1     ISARG(5,12),ISARG(6,12),ISARG(7,12),ISARG(8,12)/
              2  .TRUE.,3*.FALSE.,.TRUE.,3*.FALSE./
0023           DATA ISARG(1,13),ISARG(2,13),ISARG(3,13),ISARG(4,13),
              1     ISARG(5,13),ISARG(6,13),ISARG(7,13),ISARG(8,13)/
              2  .TRUE.,7*.FALSE./
0024           DATA ISARG(1,14),ISARG(2,14),ISARG(3,14),ISARG(4,14),
              1     ISARG(5,14),ISARG(6,14),ISARG(7,14),ISARG(8,14)/
              2  8*.TRUE./
0025           DATA ISARG(1,15),ISARG(2,15),ISARG(3,15),ISARG(4,15),
              1     ISARG(5,15),ISARG(6,15),ISARG(7,15),ISARG(8,15)/
              2  2*.TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,2*.FALSE./
0026           DATA ISARG(1,16),ISARG(2,16),ISARG(3,16),ISARG(4,16),
              1     ISARG(5,16),ISARG(6,16),ISARG(7,16),ISARG(8,16)/
              2  6*.TRUE.,.FALSE.,.TRUE./
0027           DATA ISARG(1,17),ISARG(2,17),ISARG(3,17),ISARG(4,17),
              1     ISARG(5,17),ISARG(6,17),ISARG(7,17),ISARG(8,17)/
              2  3*.TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,.FALSE./
0028           DATA ISARG(1,18),ISARG(2,18),ISARG(3,18),ISARG(4,18),
              1     ISARG(5,18),ISARG(6,18),ISARG(7,18),ISARG(8,18)/
              2  .TRUE.,.FALSE.,.TRUE.,3*.FALSE.,.TRUE.,.FALSE./
0029           DATA ISARG(1,19),ISARG(2,19),ISARG(3,19),ISARG(4,19),
              1     ISARG(5,19),ISARG(6,19),ISARG(7,19),ISARG(8,19)/
              2  .FALSE.,.FALSE.,.FALSE.,3*.FALSE.,.FALSE.,.FALSE./
0030           DATA ISARG(1,20),ISARG(2,20),ISARG(3,20),ISARG(4,20),
              1     ISARG(5,20),ISARG(6,20),ISARG(7,20),ISARG(8,20)/
              2  .TRUE.,.TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,2*.FALSE./
0031           DATA ISARG(1,21),ISARG(2,21),ISARG(3,21),ISARG(4,21),
              1     ISARG(5,21),ISARG(6,21),ISARG(7,21),ISARG(8,21)/
              2  .TRUE.,.TRUE.,.FALSE.,.FALSE.,.FALSE.,.FALSE.,2*.FALSE./
0032           DATA ISARG(1,22),ISARG(2,22),ISARG(3,22),ISARG(4,22),
              1     ISARG(5,22),ISARG(6,22),ISARG(7,22),ISARG(8,22)/
              2  .TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,.FALSE.,.TRUE.,.FALSE./
         C
         C
         C WHEN ECHNO IS NEG, SPECIAL SUPPORT IS REQUIRED
0033           ISPSH=0
```

```
      IF(FCBN0.LT.0)ISPSH=1
      FCBN2=IABS(FCBN0)
C
C LOAD FCB VALUES
      FCBG(1) = 0
      FCBG(2) = FCBN2
      FCBG(3) = ISPSH
      FCBG(4) = Y
      FCBG(5) = A
      FCBG(6) = D
      FCBG(7) = B
      FCBG(8) = V
      FCBG(9) = C
      FCBG(10)= W
      FCBG(11)= D
C
C VALIDATE ARGUMENT IF USED, SET TO ZERO IF NOT.
      K=0
      DO 400 I=4,10,2
      J=I+1
       IF(ISARG(I-3,IS)) GO TO 100
      FCBG(I)=0
      GOTO 200
  100 K=K+1
      IF(FCBG(I).LT.BIDMN.OR.FCBG(I).GT.BIDMX) GO TO 1000
200   IF(ISARG(J-3,IS)) GO TO 300
      FCBG(J)=0
      GOTO 400
  300 K=K+1
      IF(FCBG(J).LT.SIDMN.OR.FCBG(J).GT.SIDMX) GO TO 1000
400   CONTINUE
C
C START MAP AND RETURN
C
      FCBGN = RUNMP(FCBG(1),FCBS(1))
      RETURN
C
C MAP EXECUTION ABORTED:  SET ERROR CODE AND RETURN
 1000 FCBGN=-K
      IF(FCBGN.NE.0)CALL MPERR(FCBGN)
      RETURN
      END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000436	143	RW,I,CON,LCL
$IDATA	000014	6	RW,D,CON,LCL
$VARS	000610	196	RW,D,CON,LCL
MPZZZ	000312	101	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 001574   446

NO FPP INSTRUCTIONS GENERATED

FCHGN,LP/LI:1=FCHGN/DE/NOTR

```
FORTRAN IV-PLUS V02-51F          13:37:15     09-AUG-80           PAGE 1
FF2R.FTN           /WR

0001            INTEGER FUNCTION FF2R (Y, SA, U, V, W)
0002            INTEGER FCBGN, Y, SA, U, V, W
0003            FF2R = FCBGN(-214, Y, SA, U, 0, V, 0, W, 0, 14)
0004            RETURN
0005            END

PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  000054     22             RW,I,CON,LCL
$PDATA  000014      6             RW,D,CON,LCL
$IDATA  000030     12             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000120    40

NO FPP INSTRUCTIONS GENERATED

FF2R,LP/LI:1=FF2R/NOTR
```

```
FORTRAN IV-PLUS V02-51F          13:35:39     09-AUG-80            PAGE 1
VMOV1.FTN          /DE/WR

0001               INTEGER FUNCTION VMOV1(Y)
0002               INTEGER FCBGN,Y
0003               VMOV1=FCBGN(237,Y,0,0,0,0,0,0,0,13)
0004               RETURN
0005               END

PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  000024     10             RW,I,CON,LCL
$PDATA  000014      6             RW,D,CON,LCL
$IDATA  000030     12             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000070     28

NO FPP INSTRUCTIONS GENERATED

VMOV1,LP/LI:1=VMOV1/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:35:43    09-AUG-80          PAGE 1
VMOV2.FTN          /DE/WR

0001               INTEGER FUNCTION VMOV2(Y)
0002               INTEGER FCRGN,Y
0003               VMOV2=FCRGN(238,Y,0,0,0,0,0,0,0,11)
0004               RETURN
0005               END


PROGRAM SECTIONS

 NAME         SIZE                    ATTRIBUTES

$CODE1   000024     10              RW,I,CON,LCL
$PDATA   000014      6              RW,D,CON,LCL
$IDATA   000030     12              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000070     28

NO FPP INSTRUCTIONS GENERATED

VMOV2,LP/LI:1=VMOV2/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51F          13:35:47     09-AUG-80          PAGE 1
VMOV3.FTN            /DE/WR

                INTEGER FUNCTION VMOV3(Y)
                INTEGER FCHGN,Y
                VMOV3=FCHGN(239,Y,0,0,0,0,0,0,0,13)
                RETURN
                END

PROGRAM SECTIONS

 NAME        SIZE                   ATTRIBUTES

SCODE1  000024    10                RW,I,CON,LCL
SPDATA  000014     6                RW,D,CON,LCL
SIDATA  000030    12                RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000070    28

NO FPP INSTRUCTIONS GENERATED

VMOV3,LP/LI:1=VMOV3/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:35:51     09-AUG-80            PAGE 1
MPEDVM.FTN       /DE/WR

0001            INTEGER FUNCTION MPEDVM(Y,U,V)
         C
         C      MAP USAGE:
         C
         C      IERR=MPEDVM(Y,U,V)
         C
0002            INTEGER ECBGN,Y,U,V
0003            MPEDVM=ECBGN(240,Y,0,U,0,V,0,0,0,8)
0004            RETURN
0005            END


PROGRAM SECTIONS

 NAME        SIZE                ATTRIBUTES

$CODE1  000040    16             RW,I,CON,LCL
$PDATA  000014     6             RW,D,CON,LCL
$IDATA  000030    12             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000104    34

NO FPP INSTRUCTIONS GENERATED

MPEDVM,LP/LI:1=MPEDVM/DE/NOTR
```

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064
UNCLASSIFIED NL

8 OF 9
AD
A091663

```
FORTRAN IV-PLUS V02-51E          13:35:56     09-AUG-80            PAGE 1
MPDCTM.FTN        /DE/WR

0001             INTEGER FUNCTION MPDCTM(Y,U,V,W)
        C
        C        MAP USAGE:
        C
        C        IERR=MPDCTM(Y,U,V,W)
        C
0002             INTEGER FCBGN,Y,U,V,W
0003             MPDCTM=FCBGN(241,Y,0,U,0,V,0,W,0,22)
0004             RETURN
0005             END

PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

SCODE1  000046    19              RW,I,CON,LCL
$PDATA  000014     6              RW,D,CON,LCL
$IDATA  000030    12              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000112    37

NO FPP INSTRUCTIONS GENERATED

MPDCTM,LP/LI:1=MPDCTM/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:36:01     09-AUG-80           PAGE 1
MPQDPP.FTN         /DE/WR

0001                INTEGER FUNCTION MPQDPP(Y,U,V)
         C
         C          MAP USAGE:
         C
         C          IERR=MPQDPP(Y,U,V)
         C
0002                INTEGER FCHGN,U,Y,V,W
0003                MPQDPP=FCHGN(242,Y,0,U,0,V,0,0,0,8)
0004                RETURN
0005                END

PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

$CODE1  000040    16            RW,I,CON,LCL
$PDATA  000014     6            RW,D,CON,LCL
$IDATA  000030    12            RW,D,CON,LCL
$VARS   000007     1            RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000106    35

NO FPP INSTRUCTIONS GENERATED

MPQDPP,LP/LI:1=MPQDPP/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51F          13:36:05     09-AUG-80            PAGE 1
MPDOPP.FTN         /DE/WR

0001            INTEGER FUNCTION MPDOPP(Y,U,V)
          C
          C     MAP USAGE:
          C
          C     IERR=MPDOPP(Y,U,V)
          C
0002            INTEGER FCBGN,U,Y,V,W
0003            MPDOPP=FCBGN(243,Y,0,U,0,V,0,0,0,H)
0004            RETURN
0005            END

PROGRAM SECTIONS

 NAME      SIZE                  ATTRIBUTES

SCODE1  000040    16             RW,I,CON,LCL
SPDATA  000014     6             RW,D,CON,LCL
SIDATA  000030    12             RW,D,CON,LCL
SVARS   000002     1             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000106    35

NO FPP INSTRUCTIONS GENERATED

MPDOPP,LP/LI:1=MPDOPP/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:36:10     09-AUG-80           PAGE 1
MPMWGX.FTN             /DE/WR

0001                   INTEGER FUNCTION MPMWGX(Y,U,V,W)
             C
             C         MAP USAGE:
             C
             C         IERR=MPMWGX(Y,U,V,W)
             C
0002                   INTEGER FCBGN,Y,U,V,W
0003                   MPMWGX=FCBGN(244,Y,0,U,0,V,0,W,0,22)
0004                   RETURN
0005                   END

PROGRAM SECTIONS

 NAME        SIZE                   ATTRIBUTES

$CODE1  000046     19               RW,I,CON,LCL
$PDATA  000014      6               RW,D,CON,LCL
$IDATA  000030     12               RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000112    37

NO FPP INSTRUCTIONS GENERATED

MPMWGX,LP/LI:1=MPMWGX/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:36:14    09-AUG-80          PAGE 1
MPFSTV.FTN          /DE/WR

0001                INTEGER FUNCTION MPFSTV(U)
          C
          C         MAP USAGE:
          C
          C         IERR=MPFSTV(U)
          C
0002                INTEGER FCBGN,U
0003                MPFSTV=FCBGN(245,0,0,U,0,0,0,0,0,10)
0004                RETURN
0005                END


PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  000024    10              RW,I,CON,LCL
$PDATA  000014     6              RW,D,CON,LCL
$IDATA  000030    12              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000070    28

NO FPP INSTRUCTIONS GENERATED

MPFSTV,LP/LI:1=MPFSTV/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:36:18     09-AUG-80            PAGE 1
MPSSRT.FTN         /DE/WR

0001                 INTEGER FUNCTION MPSSRT(Y)
            C
            C        MAP USAGE:
            C
            C        IERR=MPSSRT(Y)
            C
0002                 INTEGER FCBGN,Y
0003                 MPSSRT=FCBGN(247,Y,0,0,0,0,0,0,0,13)
0004                 RETURN
0005                 END

PROGRAM SECTIONS

 NAME        SIZE                  ATTRIBUTES

SCODE1   000024     10             RW,I,CON,LCL
SPDATA   000014      6             RW,D,CON,LCL
SIDATA   000030     12             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000070    28

NO FPP INSTRUCTIONS GENERATED

MPSSRT,LP/LI:1=MPSSRT/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E          13:36:23     09-AUG-80          PAGE 1
MPIDCM.FTN         /DE/WR

0001                INTEGER FUNCTION MPIDCM(Y,U,V)
          C
          C         MAP USAGE:
          C
          C         IERR=MPIDCM(Y,U,V)
          C
0002                INTEGER FCBGN,U,Y,V,W
0003                MPIDCM=FCBGN(248,Y,0,U,0,V,0,0,0,8)
0004                RETURN
0005                END

PROGRAM SECTIONS

 NAME        SIZE                 ATTRIBUTES

$CODE1   000040    16            RW,I,CON,LCL
$PDATA   000014     6            RW,D,CON,LCL
$IDATA   000030    12            RW,D,CON,LCL
$VARS    000002     1            RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000106    35

NO FPP INSTRUCTIONS GENERATED

MPIDCM,LP/LI:1=MPIDCM/DE/NOTR
```

```
0001            INTEGER FUNCTION MPASRT(Y)
        C
        C       MAP USAGE:
        C
        C       IERR=MPASRT(Y)
        C
0002            INTEGER FCHGN,Y
0003            MPASRT=FCHGN(249,Y,0,0,0,0,0,0,0,13)
0004            RETURN
0005            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000024	10	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000030	12	RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000070   28

NO FPP INSTRUCTIONS GENERATED

MPASRT,LP/LI:1=MPASRT/DE/NOTR

```
FORTRAN IV-PLUS V02-51F          13:36:33     09-AUG-80            PAGE 1
MPFSTO.FTN       /DE/WR

0001                INTEGER FUNCTION MPFSTO(Y,U,V,W)
        C
        C           MAP USAGE:
        C
        C           IERR=MPFSTO(Y,U,V,W)
        C
0002                INTEGER FCBGN,Y,U,V,W
0003                MPFSTO=FCBGN(250,Y,0,U,0,V,0,W,0,22)
0004                RETURN
0005                END

PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  000046    19              RW,I,CON,LCL
$PDATA  000014     6              RW,D,CON,LCL
$IDATA  000030    12              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000112    37

NO FPP INSTRUCTIONS GENERATED

MPFSTO,LP/LI:1=MPFSTO/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51F          13:36:37     09-AUG-80            PAGE 1
MPFSTD.FTN        /DE/WR

0001                INTEGER FUNCTION MPFSTD(Y,U,V,W)
            C
            C       MAP USAGE:
            C
            C       IERR=MPFSTD(Y,U,V,W)
            C
0002                INTEGER FCBGN,Y,U,V,W
0003                MPFSTD=FCBGN(251,Y,0,U,0,V,0,W,0,22)
0004                RETURN
0005                END

PROGRAM SECTIONS

 NAME        SIZE                  ATTRIBUTES

$CODE1   000046     19             RW,I,CON,LCL
$PDATA   000014      6             RW,D,CON,LCL
$IDATA   000030     12             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000112     37

NO FPP INSTRUCTIONS GENERATED

MPFSTD,LP/LI:1=MPFSTD/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51F         13:36:42    09-AUG-80           PAGE 1
MPVDNM.FTN         /DE/WR

0001                INTEGER FUNCTION MPVDNM(Y,U,V)
        C
        C           MAP USAGE:
        C
        C           IERR=MPVDNM(Y,U,V)
        C
0002                INTEGER FCBGN,U,Y,V
0003                MPVDNM=FCBGN(252,Y,0,U,0,V,0,0,0,8)
0004                RETURN
0005                END

PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  000040    16              RW,I,CON,LCL
$PDATA  000014     6              RW,D,CON,LCL
$IDATA  000030    12              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000104    34

NO FPP INSTRUCTIONS GENERATED

MPVDNM,LP/LI:1=MPVDNM/DE/NOTR
```

```
FORTRAN IV-PLUS V02-51E         13:36:47    09-AUG-80          PAGE 1
MPBASP.FTN      /DE/WR

0001                INTEGER FUNCTION MPBASP(Y,U,V,W)
          C
          C         MAP USAGE:
          C
          C         IERR=MPBASP(Y,U,V)
          C
0002                INTEGER FCBGN,Y,U,V,W
0003                MPBASP=FCBGN(253,Y,0,U,0,V,0,W,0,22)
0004                RETURN
0005                END

PROGRAM SECTIONS

 NAME       SIZE                    ATTRIBUTES

SCODE1  000046     19               RW,I,CON,LCL
SPDATA  000014      6               RW,D,CON,LCL
SIDATA  000030     12               RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000112     37

NO FPP INSTRUCTIONS GENERATED

MPBASP,LP/LI:1=MPBASP/DE/NOTR
```

```
0001            INTEGER FUNCTION MPSCAN(Y)
          C
          C     MAP USAGE:
          C
          C     IERR=MPSCAN(Y)
          C
0002            INTEGER FCBGN,U,Y,V,W
0003            MPSCAN=FCBGN(254,Y,0,0,0,0,0,0,0,13)
0004            RETURN
0005            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000024	10	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000030	12	RW,D,CON,LCL
$VARS	000006	3	RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000076   31

NO FPP INSTRUCTIONS GENERATED

MPSCAN,LP/LI:1=MPSCAN/DE/NOTR

```
FORTRAN IV-PLUS V02-51F          13:36:56     09-AUG-80            PAGE 1
MPCDBA.FTN        /DE/WR

0001             INTEGER FUNCTION MPCDBA(Y)
        C
        C        MAP USAGE:
        C
        C        IERR=MPCDBA(Y)
        C
0002             INTEGER FCBGN,Y,U,V
0003             MPCDBA=FCBGN(255,Y,0,0,0,0,0,0,0,13)
0004             RETURN
0005             END


PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  000024    10              RW,I,CON,LCL
$PDATA  000014     6              RW,D,CON,LCL
$IDATA  000030    12              RW,D,CON,LCL
$VARS   000004     2              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000074    30

NO FPP INSTRUCTIONS GENERATED

MPCDBA,LP/LI:1=MPCDBA/DE/NOTR
```

```
        C        PROGRAM NAME:MASTER.ATC          ORIGINATED:05-FEB-79
        C                                               UPDATE:23-MAY-80
        C        THIS IS THE CONTROLLER FOR THE DCA ATC MAP-300 SYSTEM
        C
        C
        C
        C
0001             INTEGER BUS1,BUS2,BUS3
0002             INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                 1,BYTE4,BYTER,CNVYES,CNVNO,UNITY,STATUS,SHORT
0003             INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,F1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,QRPRM,QRDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,QPRM,OTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,DOIB
                 9,RECV,AROPB,ARQDCT,RIBIT
                 1,DCT1I1,DCT1I2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0004             INTEGER ORDR,START,SIZE,DSW,BTLTH
0005             INTEGER QTDCT,QTPAR,QTDC,QTVAR,QTM,QTG,QTV
0006             LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007             COMMON/SECTIO/MODDL
0008             COMMON/MTAPE0/NIN(300),NOUT(300)
0009             COMMON/MTAPE1/NSKIP,IST,NTOTI,NIUPS,NTOTO
0010             COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011             COMMON/MTAPE3/NBF(1324),NBUF(1324)
0012             COMMON/MTAPE4/LST,IBEG
0013             COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
                 1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
0014             COMMON/MTAPE6/APPEND
0015             COMMON/DELAY/M4,M3,M2,M1,IV4,IV3,IV2,IV1
0016             COMMON/CHANEL/IAQPB(14),IAQDCT(256)
0017             COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0018             COMMON/OVRO/Y(256),NP,XN
0019             COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0020             COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0021             COMMON/OVRP/K,G,V0,PWEI1(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0022             COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0023             COMMON/OVR2/IORDR(256),LTHM1
0024             COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0025             COMMON/OVRF/XR(512)
0026             COMMON/OVRD/CSN,START,SIZE,YES,NO
0027             COMMON/OVRQT/QTDCT(256),QTPAR(8),QTDC,QTVAR,QTM,QTG,QTV
0028             COMMON/OVRDT/DTDCT(256),DTPAR(8),DTDC,DTVAR,DTM,DTG,DTV,DTA(8)
0029             COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,QRPRM,QRDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,QPRM,OTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,IQPB
```

```
                 8,SYNB1,SYNB2,BF1,BF2,DDIB
                 9,RECV,ARQPB,ARQPCT,FIBIT
                 1,DCTIT1,DCTIT2,IORDR1,IORDR2,FIBIT1,FIBIT2,MIBIT3,MIBIT4,OTDCT1
0030             DATA IOATT,IOSUC,IEALN/0001400,1,-34/
0031             DATA IORWD,IOWLB,IEVER,IOSEF,IORLB/02400,0400,-4,02440,01000     /
0032             DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
0033             DATA MASK/0377/
0034             DATA MT0/0,2048,0,0,0,0/
0035             DATA MT1/0,2048,0,0,0,0/
          C      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
          C
          C      <<<<<<<<<<<<<<<<<<<<<<<<<<
          C      >>>>> INITIALIZATION <<<<<
          C      >>>>>>>>>>>>>>>>>>>>>>>>>>
          C
0036             CALL INIT
0037             CALL USER
0038             CALL MAPON
0039             CALL CREATE
0040             CALL DEFINE
0041             CALL SETUP
0042             IF(LIVE.EQ.YES)GO TO 4000
          C
          C      <<<<<<<<<<<<<<<<<<<<<<<
          C      >>>>> TRANSMITTER <<<<<
          C      >>>>>>>>>>>>>>>>>>>>>>>
          C
0043      1001   CALL INPUT
0044             MODUL=1
          C      SELECT APPROP. CDBA
0045             IF(SEND.NE.0)GO TO 5000
0046             IF(RETIM.EQ.YES)GO TO 4000
0047             CALL DCVAR
0048             CALL DCTF
0049             CALL PITLPC
0050             CALL ODPARM
0051             CALL VPBS
0052             CALL BASIS
0053             CALL ASRT
0054             CALL SDCT
0055             CALL BITA
0056             CALL ODCT
          C
          C      <<<<<<<<<<<<<<<<<<<<<<<
          C      >>>>>>> CHANNEL <<<<<<<
          C      >>>>>>>>>>>>>>>>>>>>>>>
          C
0057             CALL CHANL
          C
          C      <<<<<<<<<<<<<<<<<<<<<<<<
          C      >>>>>>> RECEIVER <<<<<<<
          C      >>>>>>>>>>>>>>>>>>>>>>>>
          C
          C      SELECT APPROP. CDBA
0058             MODUL=2
0059             CALL DPARM
```

```
               CALL VPBS
               CALL BASIS
               CALL SSRT
               CALL SDCT
               CALL RITA
               CALL DDCT
               CALL DCTR
               CALL VARDC
      4000     CALL SYSTEM
      5000     CALL OUTPUT
C
C              <<<<<<<<<<<<<<<<<<<<<<<<<<<
C              >>>>> MONITOR RESULTS <<<<<
C              >>>>>>>>>>>>>>>>>>>>>>>>>>>
C
               CALL SNR
               LIVE=YES
               GO TO 4000
               END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000436	143	RW,I,CON,LCL
$IDATA	000002	1	RW,D,CON,LCL
$VARS	000044	18	RW,D,CON,LCL
SECTIO	000002	1	RW,D,OVR,GBL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000004	2	RW,D,OVR,GBL
DELAY	000020	8	RW,D,OVR,GBL
CHANEL	001034	270	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
OVRQT	001032	269	RW,D,OVR,GBL
OVRDT	002124	554	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 044316 9319

NO FPP INSTRUCTIONS GENERATED

MASTER,LP/LI:1=MASTER.ATC/DE/NOTR

```
      C       PROGRAM NAME:INIT.FTN   ORIGINATED:05-FEB-79
      C                                       UPDATE:29-MAY-80
      C
      C
      C
      C
0001          SUBROUTINE INIT
0002          INTEGER BUS1,BUS2,BUS3
0003          INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
              1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004          INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,QRPRM,ORDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,OPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AQPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,AROPB,ARODCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005          INTEGER ORDR,START,SIZE,DSW,BTLTH
0006          LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007          COMMON/MTAPE0/NIN(300),NOUT(300)
0008          COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009          COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010          COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011          COMMON/OVRO/Y(256),NP,XN
0012          COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013          COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014          COMMON/OVRP/M,G,V0,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015          COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016          COMMON/OVR2/IORDR(256),LTHM1
0017          COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018          COMMON/OVRF/XR(512)
0019          COMMON/OVRD/CSN,START,SIZE,YES,NO
0020          COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,QRPRM,ORDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,OPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AQPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,AROPB,ARODCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021          DATA YES,NO/'Y','N'/
      C
      C       DETERMINE CONSTANTS
      C
      C       DCT BIT ALLOCATION,BTLTH
0022          BTLTH=268
      C       FFT SIZES,M...
```

```
0023                    NSHRT=8
0024                    NLONG=9
              C         VERY ACCURATE VALUE FOR PI=3.14159...
0025                    PI=4.0*ATAN(1.)
              C         LOGARITHM BASE 10 OF 2
0026                    DLOG2=ALOG(2.0)
              C         TRANSMIT,RECEIVE SIZE,LSEN
0027                    LSEN=369
              C         # OF SIDEBAND BITS/FRAME,LPARM
0028                    LPARM=13
              C         FRAME SIZE,LTH
0029                    LTH=256
0030                    LTH2=2*LTH
0031                    LTH3=3*LTH
0032                    LTH4=4*LTH
0033                    LTHM1=LTH-1
              C         LPC ORDER,LPCN
0034                    LPCN=8
              C         OUTPUT INTERPOLATING SIZE,NP
0035                    NP=10
0036                    XN=NP
              C         CLEAR CUMULATIVE SNR RATIO,CNS
0037                    CNS=0.
              C         FRAME COUNTER,ICOUNT
0038                    ICOUNT=0
              C         ARGUMENT FOR TRIG FUNCTIONS
0039                    ARG=PI*(2.*LTH-1.)/(2.*LTH)
              C
              C         SET UP SPEECH I/O HANDLER
              C
0040                    IST=1
0041                    NSKIP=1
0042                    NSKIPS=NSKIP
              C         INPUT RECORD SIZE,NTOTI
0043                    NTOTI=LTH-NP
              C         INPUT UPDATE SIZE,NTUPS
0044                    NTUPS=LTH-NP
              C         OUTPUT RECORD SIZE,NTOTO
0045                    NTOTO=LTH-NP
              C         RESET ALL ARRAYS
0046                    DO 1 I=1,NTOTI
0047          1         NIN(I)=0
0048                    DO 2 I=1,NTOTO
0049          2         NOUT(I)=0
0050                    RETURN
0051                    END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000366	123	RW,I,CON,LCL
$VARS	000060	24	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL

```
$TAPE2  000012     5     RW,D,OVR,GBL
OVR1    002020   520     RW,D,OVR,GBL
OVRD    002006   515     RW,D,OVR,GBL
OVRF    006016  1543     RW,D,OVR,GBL
OVRA    000152    53     RW,D,OVR,GBL
OVRP    002022   521     RW,D,OVR,GBL
OVRB    005004  1282     RW,D,OVR,GBL
OVR2    001002   257     RW,D,OVR,GBL
OVRL    000016     7     RW,D,OVR,GBL
OVRD    000012     5     RW,D,OVR,GBL
$APDFF  000200    64     RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025450  5524

INIT,LP/LI:1=INIT/DE/NOTR
```

```
        C       PROGRAM NAME:USER.FTN   ORIGINATED:05-FEB-79
        C                                         UPDATE:12-JUN-80
        C
        C
        C
        C
0001            SUBROUTINE USER
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTER,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X11,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,ORDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPR,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPR,ARQDCT,RIBIT
                1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTOPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/MTAPE3/NBF(1324),NBUF(1324)
0011            COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSDC,IEALN,IORWD
                1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
0012            COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0013            COMMON/OVRO/Y(256),NP,XN
0014            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0015            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0016            COMMON/OVRP/M,G,V0,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0017            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0018            COMMON/OVR2/IORDR(256),LTHB
0019            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0020            COMMON/OVRE/XR(512)
0021            COMMON/OVRD/CSN,START,SIZE,YES,NO
0022            COMMON/MAPDEF/WORK,X1,X1R,X11,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,ORDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPR,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPR,ARQDCT,RIBIT
                1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
        C
        C
        C       USER INTERACTION
        C
```

```
        C         CALL ATQIO(IOATT,5,1,0,ISW,0,DSW)
0023              TYPE 106
0024    106       FORMAT(1H1,10X,'>>>>> GTE 9600 BPS ATC SYSTEM <<<<<'/)
        C         TYPE 103
        C103      FORMAT(1HS,'FRAME TIMING(Y/N)? ')
        C         READ(5,104)TIMING
0025    104       FORMAT(A1)
0026              RLTIM=YES
0027              LIVE=NO
0028              START=1
0029              IREC=1
        C         IF(TIMING.EQ.YES)GO TO 2
0030              TIMING=NO
0031              TYPE 107
        C107      FORMAT(1HS,'LIVE INPUT(Y/N)? ')
0032    107       FORMAT(1HS,'START-UP(Y/N)? ')
0033              ACCEPT 104,LIVE
0034              ITEMP=NO
0035              IF(LIVE.EQ.NO)ITEMP=YES
0036              LIVE=ITEMP
0037              IF(LIVE.EQ.YES)GO TO 1
        C         TYPE 102
        C102      FORMAT(1HS,'REAL TIME OPERATION(Y/N)? ')
        C         ACCEPT 104,RLTIM
0038              RLTIM=NO
        C2        TYPE 105
        C105      FORMAT(1HS,'STARTING FRAME # =')
        C         ACCEPT 101,START
0039              START=1
0040              IREC=1
        C         IF(TIMING.EQ.YES)GO TO 1
        C         TYPE 100
        C100      FORMAT(1HS,'NO. OF FRAMES= ')
        C         ACCEPT 101,IREC
0041    101       FORMAT(I6)
        C1        TYPE 110
0042    1         CONTINUE
        C110      FORMAT(//1X,'SYSTEM INITIALIZATION:')
0043              RETURN
0044              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000220	72	RW,I,CON,LCL
SIDATA	000104	34	RW,D,CON,LCL
SVARS	000046	19	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
OVE1	002020	520	RW,D,OVR,GBL
OVRD	002006	515	RW,D,OVR,GBL

```
OVRE     006016  1543    RW,D,OVR,GBL
OVRA     000152    53    RW,D,OVR,GBL
OVRP     002022   521    RW,D,OVR,GBL
OVRB     005004  1282    RW,D,OVR,GBL
OVR2     001002   257    RW,D,OVR,GBL
OVRL     000016     7    RW,D,OVR,GBL
OVRD     000012     5    RW,D,OVR,GBL
$APDFF   000200    64    RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 037740  8176

NO FPP INSTRUCTIONS GENERATED

USER,LP/LI:1=USER/DE/NOTR
```

```
          C        PROGRAM NAME:MAPON.FTN  ORIGINATED:05-FEB-79
          C                                          UPDATE:14-JUL-80
          C
          C
          C
          C
0001               SUBROUTINE MAPON
0002               INTEGER ZERO(738),PARITY,RCVOFF
0003               DIMENSION SCALAR(127)
0004               INTEGER BUS1,BUS2,BUS3
0005               INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                   1,BYTE4,BYTE8,CNVYES,CNVNO,DRITY,STATUS,SHORT
0006               INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,ORDCTM,YNM,ORPRM,ORDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,OPRM,OTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AOPR,AOTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,AROPR,AROOCT,RIBIT
                   1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
                   2,ZRO
          C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0007               INTEGER ORDR,START,SIZE,DSW,BTLTH
0008               LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0009               COMMON/MTAPE0/NIN(300),NOUT(300)
0010               COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0011               COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0012               COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0013               COMMON/OVRO/Y(256),NP,XN
0014               COMMON/OVRE/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0015               COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0016               COMMON/OVRP/4,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0017               COMMON/OVR6/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0018               COMMON/OVR2/IORDR(256),LTHM1
0019               COMMON/OVRL/SLOG,LNGTH,CIEEP,ITOT,BTLTH
0020               COMMON/OVRF/XR(512)
0021               COMMON/OVRD/CSN,START,SIZE,YES,NO
0022               COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,OFDCTM,YNM,ORPRM,ORDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,OPRM,OTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AOPR,AOTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,AROPR,AROOCT,RIBIT
                   1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
0023               EQUIVALENCE (SCALAR(1),Y(1)),(ZERO(1),XR(1))
0024               DATA ZERO/738*0/
          C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0025               DATA REAL,CMPLX,INTGR/0,1,2/
0026               DATA EVERY,SINGLE,DOUBLE/1,2,3/
```

```
      DATA BYTE2,BYTE4,BYTE8/2,4,8/
      DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
      DATA BUS1,BUS2,BUS3/64,128,192/
      DATA WORK,X1,X1R,X11,IORDR#,PWEITM,DCTM1/10,11,0,0,12,13,14/
      DATA DCTM2,R1,A1,KF,PARC,TMP1,TMP2/15,16,17,18,3,19,20/
      DATA DRDCTM,YNM/21,0/
      DATA VLONG,COSZ,VSHRT,YDM,XDM,MAPX/23,24,25,26,27,28/
      DATA MIBIT,DCTM,OPRM,OTDCTM/29,30,31,32/
      DATA NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2/33,34,35,36,37,38/
      DATA RECV1,RECV2,SEN1,SEN2/39,40,41,42/
      DATA AOPM,AOTDCT,AIBIT/33,44,45/
      DATA TMP3,TMP4,X2/46,47,48/
      DATA SEN,INPB/49,50/
      DATA SYNB1,BF1/62,63/
      DATA RECV,AROPR,AROQCT,RIBIT/56,57,58,2/
      DATA OUTB,ZRO,UNITY/59,1,63/
      DATA DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1/51,52,53,54,55/
      DATA MIBIT2,MIBIT3,MIBIT4,OTDCT1/60,5,6,7/
      DATA PARITY,INIT,RCVOFF/114,113,127/
      DATA QRPRM,QRDCTM/8,9/
```

```
C
C                                 K A P - 3 0 0
C                          B U F F E R    A R E A S
C-------------------------------------------------------------------------------
C BID      BID #   BUS        BA      BA+NS-1        NS    ST    SI    WS
C-------------------------------------------------------------------------------
C AOPB      43      1      35328.     35341.         14     I     E     L
C-------------------------------------------------------------------------------
C AQIDCT    44      1      35342.     35597.        256     I     E     L
C-------------------------------------------------------------------------------
C AIBIT     45      1      35598.     35853.        256     I     E     L
C-------------------------------------------------------------------------------
C SFG       49      1      35854.     36223.        370     I     E     L
C-------------------------------------------------------------------------------
C INPB      50      1      36224.     36479.        256     I     E     L
C-------------------------------------------------------------------------------
C BF1       63      1      36480.     36848.        369     I     E     L
C-------------------------------------------------------------------------------
C BF2               1      36849.     37217.        369     I     E     L
C-------------------------------------------------------------------------------
C BF3               1      37218.     37586.        369     I     E     L
C-------------------------------------------------------------------------------
C ZRO        1      1      37587.     37955.        369     I     E     L
C-------------------------------------------------------------------------------
C OUTB      59      1      37956.     38211.        256     I     E     L
C-------------------------------------------------------------------------------
C RECV      56      1      38212.     38581.        370     I     E     L
C-------------------------------------------------------------------------------
C AROFB     57      1      38582.     38595.         14     I     E     L
C-------------------------------------------------------------------------------
C ARQUCT    58      1      38596.     38851.        256     I     E     L
C-------------------------------------------------------------------------------
C SYNB1     62      1      38852.     39220.        369     I     E     L
C-------------------------------------------------------------------------------
C SYNB2             1      39221.     39589.        369     I     E     L
C-------------------------------------------------------------------------------
C RIBIT      2      1      39590.     36245.        256     I     E     L
C-------------------------------------------------------------------------------
C BIDBF1    63      1      10000.     14499.       4500     I     E     L
C-------------------------------------------------------------------------------
C BIDBF2            1       8800.      9999.       1200     I     E     L
C-------------------------------------------------------------------------------
```

```
C-----------------------------------------------------------------------
C COSZ       24     2     1024.0     1535.0      256     R     E     L
C-----------------------------------------------------------------------
C YOM        26     2     2048.0     2067.0       10     R     E     L
C-----------------------------------------------------------------------
C AOM        27     2     2068.0     2067.0       10     R     E     L
C-----------------------------------------------------------------------
C MAPX#      28     2     2068.0     2579.0      256     R     E     L
C-----------------------------------------------------------------------
C MIBIT      29     2     2088.0     2343.0      256     I     E     L
C-----------------------------------------------------------------------
C DCIM       30     2     2344.0     2855.0      256     R     E     L
C-----------------------------------------------------------------------
C                   2     2856.0     2867.0       12     I     E     L
C-----------------------------------------------------------------------
C OTDCIM     32     2     2868.0     3123.0      256     I     E     L
C-----------------------------------------------------------------------
C NINM       33     2     3124.0     3369.0      246     I     E     L
C-----------------------------------------------------------------------
C NIN1       34     2     3370.0     3615.0      246     I     E     L
C-----------------------------------------------------------------------
C NIN2       35     2     3616.0     3861.0      246     I     E     L
C-----------------------------------------------------------------------
C NOUTM      36     2     3862.0     4107.0      246     I     E     L
C-----------------------------------------------------------------------
C NOUT1      37     2     4108.0     4353.0      246     I     E     L
C-----------------------------------------------------------------------
C NOUT2      38     2     4354.0     4599.0      246     I     E     L
C-----------------------------------------------------------------------
C RECV1      39     2     4600.0     4968.0      369     I     E     L
C-----------------------------------------------------------------------
C RECV2      40     2     4969.0     5337.0      369     I     E     L
C-----------------------------------------------------------------------
C SEN1       41     2     5340.0     5709.0      370     I     E     L
C-----------------------------------------------------------------------
C SEN2       42     2     5710.0     6079.0      370     I     E     L
C-----------------------------------------------------------------------
C DCTIT1     51     2     9000.0     9511.0      256     R     E     L
C-----------------------------------------------------------------------
C DCTIT2    52     2      9512.0    10023.0      256     R     E     L
C-----------------------------------------------------------------------
C IORDR1     53     2    10024.0    10279.0      256     I     E     L
C-----------------------------------------------------------------------
C IORDR2     54     2    10280.0    10535.0      256     I     E     L
C-----------------------------------------------------------------------
C MIBIT1     55     2    10536.0    10791.0      256     I     E     L
C-----------------------------------------------------------------------
C MIBIT2     60     2    10792.0    11047.0      256     I     E     L
C-----------------------------------------------------------------------
C OTDCT1      7     2    11048.0    11303.0      256     I     E     L
C-----------------------------------------------------------------------
C MIBIT3      5     2    11304.0    11559.0      256     I     E     L
C-----------------------------------------------------------------------
C MIBIT4      6     2    11560.0    11815.0      256     I     E     L
C-----------------------------------------------------------------------
```

```
      C QPRK        11    2    11816.0   11829.0    14   I   E   L
      C-----------------------------------------------------------------
      C QRPK4        8    2    11830.0   11843.0    14   I   E   L
      C-----------------------------------------------------------------
      C QROCIM       9    2    11844.0   12099.0   256   I   E   L
      C-----------------------------------------------------------------
```

```
C------------------------------------------------------------------------------
C *ORK          10     3       0.0     2047.0      512     C      E      L
C------------------------------------------------------------------------------
C X1            11     3    2048.0     4095.0      512     C      E      L
C------------------------------------------------------------------------------
C XIP*                 3                           512     R      E      L
C------------------------------------------------------------------------------
C XII*                 3                           512     R      E      L
C------------------------------------------------------------------------------
C X2            48     3    2048.0     3071.0      256     C      E      L
C------------------------------------------------------------------------------
C IORDR9*       12     3       0.0      255.0      256     I      E      L
C------------------------------------------------------------------------------
C P*FIT9*       13     3       0.0      255.0      256     I      E      L
C------------------------------------------------------------------------------
C OCTM1*        14     3     512.0     1023.0      256     R      E      L
C------------------------------------------------------------------------------
C OCTM2*        15     3    1024.0     1535.0      256     R      E      L
C------------------------------------------------------------------------------
C RI*           16     3       0.0       17.0        9     R      E      L
C------------------------------------------------------------------------------
C AI*           17     3      18.0       33.0        8     R      E      L
C------------------------------------------------------------------------------
C KF*           18     3      35.0       66.0       16     R      E      L
C------------------------------------------------------------------------------
C PARC*          3     3                              8     R      E      L
C------------------------------------------------------------------------------
C TMP1*         19     3    2048.0     2559.0      256     R      E      L
C------------------------------------------------------------------------------
C TMP2*         20     3    2560.0     3071.0      256     R      E      L
C------------------------------------------------------------------------------
C TMP3*         46     3    3584.0     4095.0      256     R      E      L
C------------------------------------------------------------------------------
C TMP4*         47     3    3072.0     3583.0      256     R      E      L
C------------------------------------------------------------------------------
C ORDCTM*       21     3    1024.0     1535.0      256     R      E      L
C------------------------------------------------------------------------------
C XNM*                 3     512.0     1023.0      256     R      E      L
C------------------------------------------------------------------------------
C VLONG         23     2    4096.0     5119.0      512     R      E      L
C------------------------------------------------------------------------------
C VSHRT         25     2    5120.0     5631.0      256     R      E      L
C------------------------------------------------------------------------------
```

```
                C
                C          INITIAL MAP-300 SETUP
                C
      0047      D          INSTR=0
      0048                 STATUS=MPOPN(3)
      0049      D          IF(STATUS.NE.0)GO TO 10
      0050      D          INSTR=-1
      0051                 STATUS=MPIBC(0)
      0052      D          IF(STATUS.NE.0)GO TO 10
                C
                C          DEFINE PROGRAM CONSTANTS
                C
                C          LARGEST FFT SIZE,LMAX
                C          SMALLEST FFT SIZE,LMIN
      0053                 LMAX=2**MLONG
      0054                 LMIN=2**MSHRT
      0055                 FLMAX=FLOAT(LMAX)
      0056                 FLMIN=FLOAT(LMIN)
                C          FRAME PROCESSING SIZE,XLTH
      0057                 XLTH=FLOAT(LTH)
                C          TRANSMIT/RECEIVE BUFFER SIZE,LSEN
      0058                 XLSEN=FLOAT(LSEN)
                C          # OF SIDEBAND BITS/FRAME,LPARM
      0059                 XLPARM=FLOAT(LPARM)
      0060                 DARG=1.0/FLOAT(LTH4)
      0061                 XLOG16=ALOG10(16.0)
                C
                C          MAP SCALAR TABLE SETUP
                C
      0062                 DO 1 I=50,127
      0063      1          SCALAR(I)=0.0
      0064                 SCALAR(50)=1.0/FLMAX
      0065                 SCALAR(51)=1.0/FLMIN
      0066                 SCALAR(54)=1.0/FLOAT(LTH)
      0067                 SCALAR(56)=DARG
      0068                 SCALAR(57)=-DARG
      0069                 SCALAR(74)=FLOAT(LPCN+1)
      0070                 SCALAR(75)=FLOAT(LPCN)
      0071                 SCALAR(76)=4.0
      0072                 SCALAR(77)=10.0E-10
      0073                 SCALAR(79)=FLOAT(BTLTH)
                C9100      TYPE 9101
                C9101      FORMAT(1HS,'BIT MAX.= ')
                C          READ(5,9002,END=9100,ERR=9100)BITMAX
      0074                 BITMAX=3.
      0075                 SCALAR(84)=BITMAX
                C9000      TYPE 9001
                C9001      FORMAT(1HS,'LPC THRESHOLD= ')
                C          READ(5,9002,END=9000,ERR=9000)THRSH
      0076                 THRSH=.995
      0077      9002       FORMAT(F15.8)
      0078                 SCALAR(86)=THRSH
      0079                 SCALAR(87)=FLOAT(LTH)
      0080                 SCALAR(88)=0.62293E-01
      0081                 SCALAR(89)=0.44600E+01
```

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0082            SCALAR(92)=FLOAT(LTH2)
0083            SCALAR(94)=20.0
0084            SCALAR(95)=XLOG16
0085            SCALAR(97)=FLOAT(LTH-1)
0086            SCALAR(98)=0.05
0087            SCALAR(100)=0.62293E-01
0088            SCALAR(101)=0.44600E+01
0089            SCALAR(102)=0.62293E-01
0090            SCALAR(103)=0.44600E+01
0091            SCALAR(PARITY)=0.0
0092      D     INSTR=40
0093            STATUS=MPWST(50,SCALAR(50),77,(NVYES)
0094      D     IF(STATUS.NE.0)GO TO 10
0095      D     INSTR=41
0096            STATUS=MPIST(INIT,0)
0097      D     IF(STATUS.NE.0)GO TO 10
0098      D     INSTR=42
0099            STATUS=MPIST(RCVOFF,-1)
0100      D     IF(STATUS.NE.0)GO TO 10
          C
          C
          C     MAP BUFFER SETUP
          C
          C>>>>>>>DEFINE FFT AREAS
0101      D     INSTR=1
0102            STATUS=MPCLB(BUS3+X1,2048.0,FLMAX,CMPLX,EVERY,LONG)
0103      D     IF(STATUS.NE.0)GO TO 10
0104      D     INSTR=4
0105            STATUS=MPCLB(BUS3+VLONG,4096.0,FLMAX,REAL,EVERY,LONG)
0106      D     IF(STATUS.NE.0)GO TO 10
0107      D     INSTR=5
0108            STATUS=MPCLB(BUS3+WORK,0.0,FLMAX,CMPLX,EVERY,LONG)
0109      D     IF(STATUS.NE.0)GO TO 10
0110      D     INSTR=6
0111            STATUS=MPDCV(UNITY,1,LMAX,REAL)
0112      D     IF(STATUS.NE.0)GO TO 10
0113      D     INSTR=7
0114            STATUS=VCOS(VLONG,0,UNITY,50,UNITY,0)
0115      D     IF(STATUS.NE.0)GO TO 10
0116      D     INSTR=8
0117            STATUS=MPDCV(UNITY,1,LTH,REAL)
0118      D     IF(STATUS.NE.0)GO TO 10
0119      D     INSTR=9
0120            STATUS=MPCLB(BUS2+COSZ,1024.0,XLTH,REAL,EVERY,LONG)
0121      D     IF(STATUS.NE.0)GO TO 10
0122      D     INSTR=10
0123            STATUS=VCOS(COSZ,0,UNITY,56,UNITY,0)
0124      D     IF(STATUS.NE.0)GO TO 10
0125      D     INSTR=11
0126            STATUS=MPCLB(BUS3+X2,2048.0,FLMIN,CMPLX,EVERY,LONG)
0127      D     IF(STATUS.NE.0)GO TO 10
0128      D     INSTR=12
0129            STATUS=MPCLB(BUS3+VSHRT,5120.0,FLMIN,REAL,EVERY,LONG)
0130      D     IF(STATUS.NE.0)GO TO 10
0131      D     INSTR=13
0132            STATUS=MPDCV(UNITY,1,LMIN,REAL)
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0133     D          IF(STATUS.NE.0)GO TO 10
0134     D          INSTR=14
0135                STATUS=VCOS(VSHRT,0,UNITY,54,UNITY,0)
0136     D          IF(STATUS.NE.0)GO TO 10
         C>>>>>>>>DEFINE BUFFERING AREAS
0137     D          INSTR=20
0138                STATUS=MPCLB(BUS2+MAPX,2068.0,XLTH,REAL,EVERY,LONG)
0139     D          IF(STATUS.NE.0)GO TO 10
0140     D          INSTR=21
0141                STATUS=MPCLB(BUS2+XOM,2068.0,FLOAT(NP),REAL,EVERY,LONG)
0142     D          IF(STATUS.NE.0)GO TO 10
0143     D          INSTR=23
0144                STATUS=MPCLB(BUS2+YOM,2048.0,FLOAT(NP),REAL,EVERY,LONG)
0145     D          IF(STATUS.NE.0)GO TO 10
         C>>>>>>>>DEFINE LPC AREAS
0146     D          INSTR=30
0147                STATUS=MPCLB(BUS3+R1,0.0,FLOAT(LPCN+1),REAL,EVERY,LONG)
0148     D          IF(STATUS.NE.0)GO TO 10
0149     D          INSTR=31
0150                STATUS=MPCLB(BUS3+A1,18.0,FLOAT(LPCN),REAL,EVERY,LONG)
0151     D          IF(STATUS.NE.0)GO TO 10
0152     D          INSTR=32
0153                STATUS=MPCLB(BUS3+KE,35.0,FLOAT(2*LPCN),REAL,EVERY,LONG)
0154     D          IF(STATUS.NE.0)GO TO 10
0155     D          INSTR=33
0156                STATUS=MPFOR(PARC,KE)
0157     D          IF(STATUS.NE.0)GO TO 10
0158     D          INSTR=31
0159                STATUS=MPSBS(PARC,-LPCN)
0160     D          IF(STATUS.NE.0)GO TO 10
         C>>>>>>>>DEFINE BASIS SPECTRUM AREAS
0161     D          INSTR=40
0162                STATUS=MPCLB(BUS3+DCTM1,512.0,XLTH,REAL,EVERY,LONG)
0163     D          IF(STATUS.NE.0)GO TO 10
0164     D          INSTR=41
0165                STATUS=MPCLB(BUS3+DCTM2,1024.0,XLTH,REAL,EVERY,LONG)
0166     D          IF(STATUS.NE.0)GO TO 10
0167     D          INSTR=42
0168                STATUS=MPCLB(BUS2+MIBIT,2088.0,XLTH,INTGR,EVERY,LONG)
0169     D          IF(STATUS.NE.0)GO TO 10
0170     D          INSTR=43
0171                STATUS=MPCLB(BUS3+IORDEM,0.0,XLTH,INTGR,EVERY,LONG)
0172     D          IF(STATUS.NE.0)GO TO 10
0173     D          INSTR=44
0174                STATUS=MPCLB(BUS3+PWFITM,0.0,XLTH,REAL,EVERY,LONG)
0175     D          IF(STATUS.NE.0)GO TO 10
0176     D          INSTR=45
0177                STATUS=MPCLB(BUS2+DCTM,2344.0,XLTH,REAL,EVERY,LONG)
0178     D          IF(STATUS.NE.0)GO TO 10
         C>>>>>>>>DEFINE QUANTIZED PARAMETER AREAS
0179     D          INSTR=50
0180                STATUS=MPCLB(BUS2+QTDCTM,2868.0,XLTH,INTGR,EVERY,LONG)
0181     D          IF(STATUS.NE.0)GO TO 10
0182     D          INSTR=51
0183                STATUS=MPCLB(BUS2+QPPM,11616.0,XLPARM+1.,INTGR,EVERY,LONG)
0184     D          IF(STATUS.NE.0)GO TO 10
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      D         INSTR=52
                STATUS=MPCLR(BUS2+ORPEM,11830.0,XLPARM+1.,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GO TO 10
      D         INSTR=53
                STATUS=MPCLR(BUS2+ORDCTS,11844.0,XLTH,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GO TO 10
C>>>>>>>>DEFINE DEQUANTIZED PARAMETER AREAS
      D         INSTR=60
                STATUS=MPCLR(BUS3+DRDCTS,1024.0,XLTH,REAL,EVERY,LONG)
      D         IF(STATUS.NE.0)GO TO 10
C>>>>>>>>DEFINE I/O AREAS
      D         INSTR=70
                STATUS=MPCLR(BUS2+NINM,3124.0,FLOAT(NTUPS),INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GO TO 10
      D         INSTR=71
                STATUS=MPCLR(BUS2+NOUTM,3862.0,FLOAT(NTUPS),INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GO TO 10
      D         INSTR=1022
                STATUS=MPCLR(BUS2+RECV1,4600.0,XLSEN,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1024
                STATUS=MPCLR(BUS2+RECV2,4969.0,XLSEN,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1026
                STATUS=MPCLR(BUS2+SEN1,5340.0,XLSEN+1.,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1028
                STATUS=MPCLR(BUS2+SEN2,5710.0,XLSEN+1.,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1030
                STATUS=MPCLR(BUS2+NIN1,3370.0,FLOAT(NTUPS),INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1032
                STATUS=MPCLR(BUS2+NIK2,3616.0,FLOAT(NTUPS),INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1034
                STATUS=MPCLR(BUS2+NOUT1,4108.0,FLOAT(NTUPS),INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1036
                STATUS=MPCLR(BUS2+NOUT2,4354.0,FLOAT(NTUPS),INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1042
                STATUS=MPCLR(BUS1+INPR,36224.0,XLTH,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1043
                STATUS=MPCLR(BUS1+OUTR,37956.0,XLTH,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
      D         INSTR=1044
                STATUS=MPCLR(BUS1+SYNR1,36480.0,XLSEN,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
                INSTR=1055
                STATUS=MPCLR(BUS1+ZRO,37587.0,XLSEN,INTGR,EVERY,LONG)
                IF(STATUS.NE.0)GOTO 10
      D         INSTR=1054
                STATUS=MPCLR(BUS1+RF1,37218.0,XLSEN,INTGR,EVERY,LONG)
      D         IF(STATUS.NE.0)GOTO 10
```

```
D         INSTR=1045
          STATUS=MPCLR(BUS1+AIBIT,35598.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1046
          STATUS=MPCLR(BUS1+RIBIT,39590.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1048
          STATUS=MPCLR(BUS1+AOPR,35328.0,XLPARM+1.,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1049
          STATUS=MPCLR(BUS1+AOTDCT,35342.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1050
          STATUS=MPCLR(BUS1+AROPR,38582.0,XLPARM+1.,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1051
          STATUS=MPCLR(BUS1+ARODCT,38596.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1052
          STATUS=MPCLR(BUS1+SEN,35854.0,XLSEN+1.,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
D         INSTR=1056
          STATUS=MPCLR(BUS1+RECV,38212.0,XLSEN+1.,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GOTO 10
C>>>>>>>>DEFINE GENERAL PURPOSE AREAS
D         INSTR=80
          STATUS=MPCLR(BUS3+TMP1,2048.0,XLTH,REAL,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=81
          STATUS=MPCLR(BUS3+TMP2,2560.0,XLTH,REAL,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=82
          STATUS=MPCLR(BUS3+TMP3,3584.0,XLTH,REAL,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=83
          STATUS=MPCLR(BUS3+TMP4,3072.0,XLTH,REAL,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
C>>>>>>>>DEFINE "I/O REQUIRED STACK" AREAS
D         INSTR=1200
          STATUS=MPCLR(BUS2+DCTIT1,9000.0,XLTH,REAL,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=1201
          STATUS=MPCLR(BUS2+DCTIT2,9512.0,XLTH,REAL,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=1202
          STATUS=MPCLR(BUS2+IORDR1,10024.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=1203
          STATUS=MPCLR(BUS2+IORDR2,10280.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=1204
          STATUS=MPCLR(BUS2+MIBIT1,10536.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
D         INSTR=1205
          STATUS=MPCLR(BUS2+MIBIT2,10792.0,XLTH,INTGR,EVERY,LONG)
D         IF(STATUS.NE.0)GO TO 10
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D          INSTR=1206
           STATUS=MPCLB(BUS2+MIBIT3,11304,0,XLTH,INTGR,EVERY,LONG)
D          IF(STATUS.NE.0)GO TO 10
D          INSTR=1207
           STATUS=MPCLB(BUS2+MIBIT4,11560,0,XLTH,INTGR,EVERY,LONG)
D          IF(STATUS.NE.0)GO TO 10
D          INSTR=1208
           STATUS=MPCLB(BUS2+OTOCT1,11048,0,XLTH,INTGR,EVERY,LONG)
D          IF(STATUS.NE.0)GO TO 10
C9003      TYPE 9004
C9004      FORMAT(1HS,'CLEAR ALL BUFFERS(Y/N)? ')
C          READ(5,9005,END=9999,ERR=9003)ANSER
C9005      FORMAT(A1)
C          IF(ANSER.EQ.NO)GO TO 9999
C>>>>>>>>CLEAR BUFFERING AREAS
D          INSTR=100
           STATUS=VCLR(YOM)
D          IF(STATUS.NE.0)GO TO 10
D          INSTR=101
           STATUS=VCLR(XOM)
D          IF(STATUS.NE.0)GO TO 10
D          INSTR=2053
           STATUS=MPWDB(NOUT1,ZERO(1),BYTE2,CNVYES,ZERO(2*NTUPS))
D          IF(STATUS.NE.0)GOTO 10
D          INSTR=2055
           STATUS=MPWDB(NIN1,ZERO(1),BYTE2,CNVYES,ZERO(2*NTUPS))
D          IF(STATUS.NE.0)GOTO 10
D          INSTR=2057
           STATUS=MPWDB(SEN1,ZERO(1),BYTE2,CNVYES,ZERO(2*LSEN))
D          IF(STATUS.NE.0)GOTO 10
D          INSTR=2059
           STATUS=MPWDB(RECV1,ZERO(1),BYTE2,CNVYES,ZERO(2*LSEN))
D          IF(STATUS.NE.0)GOTO 10
C?????????????????????????????????????????????????????????
C          MAY NOT BE A GOOD IDEA TO SET AIBIT(I)=0
CD         INSTR=2061
C          STATUS=MPWDB(AIBIT,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
CD         IF(STATUS.NE.0)GOTO 10
C?????????????????????????????????????????????????????????
C?????????????????????????????????????????????????????????
C          MAY NOT BE A GOOD IDEA TO SET RIBIT(I)=0
CD         INSTR=2062
C          STATUS=MPWDB(RIBIT,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
CD         IF(STATUS.NE.0)GOTO 10
C?????????????????????????????????????????????????????????
D          INSTR=2064
           STATUS=MPWDB(AQPB,ZERO(1),BYTE2,CNVNO,ZERO(LPARM))
D          IF(STATUS.NE.0)GOTO 10
D          INSTR=2065
           STATUS=MPWDB(AQTDCT,ZERO(1),BYTE2,CNVNO,ZERO(LTH))
D          IF(STATUS.NE.0)GOTO 10
D          INSTR=2066
           STATUS=MPWDB(BE1,ZERO(1),BYTE2,CNVYES,ZERO(2*LSEN))
D          IF(STATUS.NE.0)GOTO 10
D          INSTR=2067
           STATUS=MPWDB(SYNB1,ZERO(1),BYTE2,CNVYES,ZERO(2*LSEN))
```

```
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2068
         STATUS=VCLR(DCTIT1)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2069
         STATUS=VCLR(DCTIT2)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2077
         STATUS=MPWDB(OTDCT1,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2078
         STATUS=MPWDB(OPRM,ZERO(1),BYTE2,CNVYES,ZERO(LPARM+1))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2079
         STATUS=MPWDB(ORPRM,ZERO(1),BYTE2,CNVYES,ZERO(LPARM+1))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2080
         STATUS=MPWDB(NOUT1,ZERO(1),BYTE2,CNVYES,ZERO(NTUPS))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2081
         STATUS=MPWDB(NOUT2,ZERO(1),BYTE2,CNVYES,ZERO(NTUPS))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2082
         STATUS=MPWDB(ZRO,ZERO(1),BYTE2,CNVYES,ZERO(LSEN))
D        IF(STATUS.NE.0)GOTO 10
         DO 9006 I=1,256
9006     ZERO(I)=I-1
D        INSTR=2071
         STATUS=MPWDB(IORDR1,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2072
         STATUS=MPWDB(IORDR2,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
         DO 9007 I=1,134
9007     ZERO(I)=2
         DO 9008 I=135,256
9008     ZERO(I)=0
D        INSTR=2073
         STATUS=MPWDB(MIBIT1,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2074
         STATUS=MPWDB(MIBIT2,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2075
         STATUS=MPWDB(MIBIT3,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=2076
         STATUS=MPWDB(MIBIT4,ZERO(1),BYTE2,CNVYES,ZERO(LTH))
D        IF(STATUS.NE.0)GOTO 10
         DO 9009 I=1,134
9009     ZERO(I)=0
9999     CONTINUE
         TYPE 101
101      FORMAT(1X,'     (1) MAP OPENED & BUFFERS DECLARED!')
         RETURN
C
```

```
              C       DIAGNOSTIC TRAP AREA
              C
0386          10      TYPE 100,INSTR,STATUS
0387                  CALL EXIT
0388          100     FORMAT(1X,'***MAP ERROR*** "MAPON" INSTR=',I4,' HAS STATUS=',I6/)
0389                  END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	010564	2234	RW,I,CON,LCL
$PDATA	000374	126	RW,D,CON,LCL
$IDATA	002344	626	RW,D,CON,LCL
$VARS	000134	46	RW,D,CON,LCL
$TEMPS	000004	2	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRG	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 040666 8411

MAPON,LP/LI:1=MAPON/DE/NOTR

```
        C      PROGRAM NAME:CREATE.FTN ORIGINATED:13-FEB-80
        C                                       UPDATE:20-MAY-80
        C
        C
        C
        C
0001           SUBROUTINE CREATE
0002           INTEGER BIDBF1,BIDBF2,BIDBF3
0003           INTEGER BUS1,BUS2,BUS3
0004           INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
               1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0005           INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
               1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
               2,DRDCTM,YNM,ORPRM,ORDCTM
               3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
               4,MIBIT,DCTM,OPRM,OTDCTM
               5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
               6,RECV1,RECV2,SEN1,SEN2
               7,AOPB,AOTDCT,AIBIT,SEN,INPB
               8,SYNB1,SYNB2,BF1,BF2,OUTB
               9,RECV,AROPB,ARODCT,RIBIT
               1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C      <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0006           INTEGER ORDR,START,SIZE,DSW,BTLTH
0007           LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008           COMMON/MTAPE0/NIN(300),NOUT(300)
0009           COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0010           COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011           COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012           COMMON/OVRO/Y(256),NP,XN
0013           COMMON/OVRE/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014           COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015           COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016           COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017           COMMON/OVR2/IORDR(256),LTHM1
0018           COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019           COMMON/OVRF/XR(512)
0020           COMMON/OVRD/CSN,START,SIZE,YES,NO
0021           COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
               1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
               2,DRDCTM,YNM,ORPRM,ORDCTM
               3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
               4,MIBIT,DCTM,OPRM,OTDCTM
               5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
               6,RECV1,RECV2,SEN1,SEN2
               7,AOPB,AOTDCT,AIBIT,SEN,INPB
               8,SYNB1,SYNB2,BF1,BF2,OUTB
               9,RECV,AROPB,ARODCT,RIBIT
               1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
 022           DATA REAL,CMPLX,INTGR/0,1,2/
0023           DATA EVERY,SINGLE,DOUBLE/1,2,3/
0024           DATA BYTE2,BYTE4,BYTE8/2,4,8/
0025           DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0026           DATA BUS1,BUS2,BUS3/64,128,192/
0027           DATA BIDBF1,BASE1,SIZE1/63,10000,0,4000,0/
```

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0028          DATA BIDBF2,BASE2,SIZE2/63,8800,0,1200,0/
0029          DATA BIDBF3,BASE3,SIZE3/63,14000,0,2380,0/
        C
        C     CONFIGURE & BIND FIRST BUFFER REGION
        C
0030    D     INSTR=100
0031          STATUS=MPCLB(BUS1+BIDBF1,BASE1,SIZE1,INTGR,EVERY,LONG)
0032    D     IF(STATUS.NE.0)GO TO 10
0033    D     INSTR=1
0034          STATUS=MPCBF(BIDBF1,153)
0035    D     IF(STATUS.NE.0)GO TO 10
0036    D     INSTR=153
0037          STATUS=MPFDVM(MAPX,NINM,X2)
0038    D     IF(STATUS.NE.0)GO TO 10
0039    D     INSTR=154
0040          STATUS=MPDCTM(DCTM,X1,X2,COSZ)
0041    D     IF(STATUS.NE.0)GO TO 10
0042    D     INSTR=155
0043          STATUS=MPMWGX(R1,NINM,KE,A1)
0044    D     IF(STATUS.NE.0)GO TO 10
0045    D     INSTR=156
0046          STATUS=MPODPP(OPRM,PARC,A1)
0047    D     IF(STATUS.NE.0)GO TO 10
0048    D     INSTR=157
0049          STATUS=MPFSTV(A1)
0050    D     IF(STATUS.NE.0)GO TO 10
0051    D     INSTR=158
0052          STATUS=MPBASP(DCTM1,PWEITM,TMP2,X1)
0053    D     IF(STATUS.NE.0)GO TO 10
0054    D     INSTR=159
0055          STATUS=MPASRT(IORDRM)
0056    D     IF(STATUS.NE.0)GO TO 10
0057    D     INSTR=160
0058          STATUS=MPSCAN(DCTM2)
0059    D     IF(STATUS.NE.0)GO TO 10
0060    D     INSTR=161
0061          STATUS=MPCDHA(MIBIT3)
0062    D     IF(STATUS.NE.0)GO TO 10
0063    D     INSTR=162
0064          STATUS=MPFSTQ(OTDCTM,MIBIT3,TMP1,TMP2)
0065    D     IF(STATUS.NE.0)GO TO 10
0066    D     INSTR=163
0067          STATUS=MPDQPP(PARC,ORPRM,A1)
0068    D     IF(STATUS.NE.0)GO TO 10
0069    D     INSTR=164
0070          STATUS=MPFSTD(DRDCTM,ORDCTM,TMP1,IORDR2)
0071    D     IF(STATUS.NE.0)GO TO 10
0072    D     INSTR=165
0073          STATUS=MPIDCM(X2,DRDCTM,COSZ)
0074    D     IF(STATUS.NE.0)GO TO 10
0075    D     INSTR=166
0076          STATUS=MPVDNM(NOUTM,YOM,X2)
0077    D     IF(STATUS.NE.0)GO TO 10
0078    D     INSTR=167
0079          STATUS=MPSSRT(IORDRM)
0080    D     IF(STATUS.NE.0)GO TO 10
```

```
0081     D        INSTR=2
0082              STATUS=MPTBF(0)
0083     D        IF(STATUS.NE.0)GO TO 10
         C
         C        CONFIGURE & BIND SECOND BUFFER REGION
         C
0084     D        INSTR=101
0085              STATUS=MPCLB(BUS1+BIDBF2,BASE2,SIZE2,INTGR,EVERY,LONG)
0086     D        IF(STATUS.NE.0)GO TO 10
0087     D        INSTR=3
0088              STATUS=MPCBF(BIDBF2,168)
0089     D        IF(STATUS.NE.0)GO TO 10
0090     D        INSTR=168
0091              STATUS=FFTN(X2,1,X2,VSHRT,WORK)
0092     D        IF(STATUS.NE.0)GO TO 10
0093     D        INSTR=169
0094              STATUS=FFTIN(X1,1,X1,VLONG,WORK)
0095     D        IF(STATUS.NE.0)GO TO 10
0096     D        INSTR=170
0097              STATUS=FF2R(X1,4,X1,VLONG,WORK)
0098     D        IF(STATUS.NE.0)GO TO 10
0099     D        INSTR=171
0100              STATUS=FFTIN(X2,1,X2,VSHRT,WORK)
0101     D        IF(STATUS.NE.0)GOTO 10
0102     D        INSTR=4
0103              STATUS=MPTBF(0)
0104     D        IF(STATUS.NE.0)GO TO 10
         C
         C        CONFIGURE & BIND THIRD BUFFER REGION
         C
0105     D        INSTR=102
0106              STATUS=MPCLB(BUS1+BIDBF3,BASE3,SIZE3,INTGR,EVERY,LONG)
0107     D        IF(STATUS.NE.0)GO TO 10
0108     D        INSTR=5
0109              STATUS=MPCBF(BIDBF3,172)
0110     D        IF(STATUS.NE.0)GO TO 10
0111     D        INSTR=172
0112              STATUS=VMOV1(AOPB)
0113     D        IF(STATUS.NE.0)GOTO 10
0114     D        INSTR=173
0115              STATUS=VMOV2(ORPPM)
0116     D        IF(STATUS.NE.0)GOTO 10
0117     D        INSTR=174
0118              STATUS=VMOV3(RIBIT)
0119     D        IF(STATUS.NE.0)GOTO 10
0120     D        INSTR=175
0121              STATUS=MPCDBA(MIBIT1)
0122     D        IF(STATUS.NE.0)GOTO 10
         C>>>>> SPECIAL "VMOV"S WHICH  FUNCTION AS NULL MODEM W/ 1 FRAME DELAY
         C  CHANGED NEXT PRE-BD-FCN FOR NO DELAY FOR DEMO ****************
0123     D        INSTR=176
0124              STATUS=VMOV(AROPB,AOPB)
0125     D        IF(STATUS.NE.0)GOTO 10
0126     D        INSTR=177
0127              STATUS=VMOV(SEN1,AOPB)
0128     D        IF(STATUS.NE.0)GOTO 10
```

```
0129      D         INSTR=178
          C CHANGED NEXT LINE FOR DEMO -- TOOK OUT DELAY******
0130                STATUS=VMOV(AQODCT,AQTDCT)
0131      D         IF(STATUS.NE.0)GOTO 10
0132      D         INSTR=179
0133                STATUS=VMOV(SEN2,AQTDCT)
0134      D         IF(STATUS.NE.0)GOTO 10
0135      D         INSTR=6
0136                STATUS=MPTHF(0)
0137      D         IF(STATUS.NE.0)GO TO 10
          C
0138                TYPE 101
0139      101       FORMAT(1X,'     (2) PRE-BOUND FUNCTIONS CREATED!')
0140                RETURN
          C
          C         DIAGNOSTIC TRAP AREA
          C
0141      10        TYPE 100,INSTR,STATUS
0142                CALL EXIT
0143      100       FORMAT(1X,'***MAP ERROR*** "CREATE" INSTR=',I4,' HAS STATUS=',I6/)
0144                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	002026	523	RW,I,CON,LCL
$PDATA	000030	12	RW,D,CON,LCL
$IDATA	000524	170	RW,D,CON,LCL
$VARS	000110	36	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 027714   6118

CREATE,LP/LI:1=CREATE/DE/NOTR

```
        C       PROGRAM NAME:DEFINE.FTN ORIGINATED:13-FEB-80
        C                                   UPDATE:09-JUL-80
        C
        C
        C
        C
0001            SUBROUTINE DEFINE
0002            REAL IOSHA,IOSSA
0003            INTEGER EO,GE,GT,SYNCNT,ANA,AFLG,SYN,SFLG,RDATA,XDATA
                1, SPIN,SPOUT,PARITY,RCVOFF,OUT,OFLG,CARD
                2,APDNFL,RGO,XGO,RGO2
                3,SYNC,RSYN,NEWSYN,OLSYN,LSTER,ERSYN
0004            INTEGER FL0,FL1,FL2,FL3,FL4,FL5,FL6,FL7
0005            INTEGER ATCANA,ATCSYN,WAIT,STRTUP,TIMER
0006            INTEGER AOM,ADAM,AOMPM,ADAMPM
0007            INTEGER BUS1,BUS2,BUS3
0008            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0009            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0010            INTEGER ORDR,START,SIZE,DSW,BTLTH
0011            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0012            COMMON/MTAPE0/NIN(300),NOUT(300)
0013            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0014            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0015            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0016            COMMON/OVRO/Y(256),NP,XN
0017            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0018            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0019            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0020            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0021            COMMON/OVR2/IORDR(256),LTHM1
0022            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0023            COMMON/OVRE/XR(512)
0024            COMMON/OVRD/CSN,START,SIZE,YES,NO
0025            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,AROPDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
```

```
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0026            DATA REAL,CMPLX,INTGR/0,1,2/
0027            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0028            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0029            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0030            DATA BUS1,BUS2,BUS3/64,128,192/
0031            DATA FL0,FL1,FL2,FL3,FL4,FL5,FL6,FL7/0,1,2,3,4,5,6,7/
0032            DATA ATCANA,ATCSYN,WAIT,STRTUP,TIMER/1,2,3,4,7/
0033            DATA IOSPM,IOS,IOSBA,IOSSA/61,2,22100.,0./
0034            DATA AOMPM,AOMBA,AOMSA,AOMSZ/62,22700.,0.,512./
0035            DATA ADAMPM,ADAMBA,ADAMSA,ADAMSZ/63,23300.,0.,512./
0036            DATA IOSID,AOM,ADAM/16,22,23/
0037            DATA EQ,NE,GE,GT,LE,LT/0,1,2,3,4,5/
0038            DATA SYNCNT/100/
0039            DATA ANA,AFLG,SYN,SFLG/100,101,102,103/
0040            DATA INP,IFLG,OUT,OFLG/106,107,104,105/
0041            DATA RDATA,XDATA,SPIN,SPOUT,KOUNT/108,109,110,111,112/
0042            DATA INIT,PARITY,PCVOFF/113,114,127/
0043            DATA APDNFL,CARD,RGO,XGO,RGO2,SYNC/126,125,114,115,116,117/
0044            DATA RSYN,NEWSYN,OLSYN,LSTER,ERSYN/118,119,120,121,122/
        C
        C       DEFINE FUNCTION LIST SUPPORT
        C
        C       LIST "ATCANA": ATC ANALYZER W/ERROR CODING AND SERIALIZATION
0045            INSTR=1043
0046            STATUS=MPHFL(ATCANA)
0047            IF(STATUS.NE.0)GOTO 10
0048    D       INSTR=30
        C       HF(172)=VMOV1(AQPR)
0049            STATUS=MPXHF(172)
0050    D       IF(STATUS.NE.0)GO TO 10
0051    D       INSTR=31
        C       HF(153)=MPFDVM(MAPX,NINM,X2)
0052            STATUS=MPXHF(153)
0053    D       IF(STATUS.NE.0)GO TO 10
0054    D       INSTR=32
        C       HF(168)=FFTN(X2,1,X2,VSHRT,WORK)
0055            STATUS=MPXHF(168)
0056    D       IF(STATUS.NE.0)GO TO 10
0057    D       INSTR=33
        C       HF(154)=MPDCTM(DCTM,X1,X2,COSZ)
0058            STATUS=MPXHF(154)
0059    D       IF(STATUS.NE.0)GO TO 10
0060    D       INSTR=34
        C       HF(169)=FFTIN(X1,1,X1,VLONG,WORK)
0061            STATUS=MPXHF(169)
0062    D       IF(STATUS.NE.0)GO TO 10
0063    D       INSTR=37
        C       HF(155)=MPMWGX(R1,NINM,KE,A1)
0064            STATUS=MPXHF(155)
0065    D       IF(STATUS.NE.0)GO TO 10
0066    D       INSTR=38
        C       HF(156)=MPODPP(QPRM,PARC,A1)
0067            STATUS=MPXHF(156)
0068    D       IF(STATUS.NE.0)GO TO 10
0069    D       INSTR=40
```

```
        C       BF(157)=MPFSTV(A1)
0070            STATUS=MPXBF(157)
0071    D       IF(STATUS.NE.0)GO TO 10
0072    D       INSTR=41
        C       BF(170)=FF2R(X1,4,X1,VLONG,WORK)
0073            STATUS=MPXBF(170)
0074    D       IF(STATUS.NE.0)GO TO 10
0075    D       INSTR=42
        C       BF(158)=MPBASP(DCTM1,PWEITM,TMP2,X1)
0076            STATUS=MPXBF(158)
0077    D       IF(STATUS.NE.0)GO TO 10
0078    D       INSTR=43
        C       BF(159)=MPASRT(IORDRM)
0079            STATUS=MPXBF(159)
0080    D       IF(STATUS.NE.0)GO TO 10
0081    D       INSTR=44
        C       BF(160)=MPSCAN(DCTM2)
0082            STATUS=MPXBF(160)
0083    D       IF(STATUS.NE.0)GO TO 10
0084    D       INSTR=45
        C       BF(161)=MPCDBA(MIBIT3)
0085            STATUS=MPXBF(161)
0086    D       IF(STATUS.NE.0)GO TO 10
0087    D       INSTR=46
        C       BF(162)=MPFSTQ(QTDCTM,MIBIT,TMP1,TMP2)
0088            STATUS=MPXBF(162)
0089    D       IF(STATUS.NE.0)GO TO 10
0090    D       INSTR=48
        C       IF(TIMING.EQ.YES)STATUS=MPXFL(ATCSYN)
0091    D       IF(STATUS.NE.0)GO TO 10
0092            INSTR=1050
0093            STATUS=MPEFL(FL1)
0094            IF(STATUS.NE.0)GOTO 10
        C
        C       LIST "ATCSYN": ATC SYNTHESIZER W/ERROR DECODER & DESERIALIZATION
0095            INSTR=1055
0096            STATUS=MPBFL(ATCSYN)
0097            IF(STATUS .NE.0)GOTO 10
        C       ***********************************
        C       PATCHED OUT FOLLOWING LINE TO EXECUTE IN "DEMO" MODE IF NOT
        C       IN TIMING MODE.
        C       IF(LIVE.EQ.YES)GO TO 200
        C       IF(TIMING.EQ.YES)GO TO 200
        C>>>>> INTRODUCE "NULL" MODEM
0098    D       INSTR=580
        C       BF(176)=VMOV(ARQPB,AQPB)
        C       STATUS=MPXBF(176)
0099    D       IF(STATUS.NE.0)GO TO 10
        C*********DON'T NEED DELAY FOR DEMO***
        CD      INSTR=581
        CC      BF(177)=VMOV(RECV1,AQPB)
        C       STATUS=MPXBF(177)
        CD      IF(STATUS.NE.0)GO TO 10
        C****************************************
0100    D       INSTR=582
        C       BF(178)=VMOV(ARQDCT,AQTDCT)
```

```
        C       STATUS=MPXBF(178)
0101    D       IF(STATUS.NE.0)GO TO 10
        C********* REMOVED FOR DEMO *******
        CD      INSTR=583
        CC      BF(179)=VMOV(RECV2,AOTDCT)
        C       STATUS=MPXBF(179)
        CD      IF(STATUS.NE.0)GO TO 10
        C*******************
0102    200     CONTINUE
0103    D       INSTR=60
        C       BF(173)=VMOV2(ORPRM)
0104            STATUS=MPXBF(173)
0105    D       IF(STATUS.NE.0)GO TO 10
0106    D       INSTR=61
        C       BF(163)=MPDOPP(PARC,ORPRM,A1)
0107            STATUS=MPXBF(163)
0108    D       IF(STATUS.NE.0)GO TO 10
0109    D       INSTR=62
        C       BF(157)=MPESTV(A1)
0110            STATUS=MPXBF(157)
0111    D       IF(STATUS.NE.0)GO TO 10
0112    D       INSTR=63
        C       BF(170)=FF2R(X1,4,X1,VLONG,WORK)
0113            STATUS=MPXBF(170)
0114    D       IF(STATUS.NE.0)GO TO 10
0115    D       INSTR=64
        C       BF(158)=MPBASP(DCTM1,PWFITM,TMP2,X1)
0116            STATUS=MPXBF(158)
0117    D       IF(STATUS.NE.0)GO TO 10
0118    D       INSTR=65
        C       BF(167)=MPSSRT(IORDRM)
0119            STATUS=MPXBF(167)
0120    D       IF(STATUS.NE.0)GO TO 10
0121    D       INSTR=66
        C       BF(160)=MPSCAN(DCTM2)
0122            STATUS=MPXBF(160)
0123    D       IF(STATUS.NE.0)GO TO 10
0124    D       INSTR=67
        C       BF(175)=MPCDBA(M1BIT1)
0125            STATUS=MPXBF(175)
0126    D       IF(STATUS.NE.0)GO TO 10
0127    D       INSTR=670
        C       BF(174)=VMOV3(R1BIT)
0128            STATUS=MPXBF(174)
0129    D       IF(STATUS.NE.0)GO TO 10
0130    D       INSTR=68
        C       BF(164)=MPESTD(DRDCTM,ORDCTM,TMP1,IORDR2)
0131            STATUS=MPXBF(164)
0132    D       IF(STATUS.NE.0)GO TO 10
0133    D       INSTR=69
        C       BF(165)=MPIDCM(X2,DRDCTM,COSZ)
0134            STATUS=MPXBF(165)
0135    D       IF(STATUS.NE.0)GO TO 10
0136    D       INSTR=70
        C       BF(171)=FFTIN(X2,1,X2,VSHRT,WORK)
0137            STATUS=MPXBF(171)
```

```
D        IF(STATUS.NE.0)GO TO 10
D        INSTR=71
C        BF(166)=MPVDNM(NOUTM,YOM,X2)
         STATUS=MPXBF(166)
D        IF(STATUS.NE.0)GO TO 10
D        INSTR=1070
         STATUS=MPEFL(FL2)
         IF(STATUS.NE.0)GOTO 10
C
C        LIST "WAIT": THE WAIT LOOP
D        INSTR=1080
         STATUS=MPBFL(WAIT)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1085
         STATUS=MPIIF(INIT,EQ,0,FL4,FL0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1090
         STATUS=MPIIF(SYN,EQ,0,ATCSYN,FL0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1095
         STATUS=MPIIF(ANA,EQ,0,ATCANA,FL0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1100
         STATUS=MPEFL(FL3)
D        IF(STATUS.NE.0)GOTO 10
C
C        LIST "STRTUP":INITIALIZATION LOOP
D        INSTR=1105
         STATUS=MPBFL(STRTUP)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1106
         STATUS=MPIST(INIT,1)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1111
         STATUS=MPIST(OUT,1)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1112
         STATUS=MPIST(INP,1)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1113
         STATUS=MPIST(AFLG,0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1114
         STATUS=MPIST(SFLG,0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1115
         STATUS=MPIST(IFLG,0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1116
         STATUS=MPIST(OFLG,0)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1117
         STATUS=MPIST(SPIN,-1)
D        IF(STATUS.NE.0)GOTO 10
D        INSTR=1118
         STATUS=MPIST(SPOUT,-1)
```

```
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1122
       STATUS=MPIST(KOUNT,SYNCNT)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1123
       STATUS=MPIST(RDATA,-1)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1124
       STATUS=MPIST(XDATA,-1)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1125
       STATUS=MPIST(APDNFL,0)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1126
       STATUS=MPIST(RGO,0)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1127
       STATUS=MPIST(XGO,0)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1128
       STATUS=MPIST(RGO2,0)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1160
       STATUS=MPIST(SYNC,0)
       IF(STATUS.NE.0)GOTO 10
D      INSTR=1161
       STATUS=MPIST(RSYN,0)
       IF(STATUS.NE.0)GOTO 10
D      INSTR=1162
       STATUS=MPIST(NEWSYN,0)
       IF(STATUS.NE.0)GOTO 10
D      INSTR=1163
       STATUS=MPIST(OLSYN,0)
       IF(STATUS.NE.0)GOTO 10
D      INSTR=1164
       STATUS=MPIST(LSTEP,0)
       IF(STATUS.NE.0)GOTO 10
D      INSTR=1165
       STATUS=MPIST(ERSYN,0)
       IF(STATUS.NE.0)GOTO 10
D      INSTR=1137
       STATUS=MPLDS(AOM,IOS,AOMPM)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1138
       STATUS=MPRNS(AOM,IOS,AOMSA)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1139
       STATUS=MPLDS(ADAM,IOS,ADAMPM)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1140
       STATUS=MPRNS(ADAM,IOS,ADAMSA)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1135
       STATUS=MPLDS(IOSTD,IOS,IOSPM)
D      IF(STATUS.NE.0)GOTO 10
D      INSTR=1136
```

```
0245                STATUS=MPRNS(IOSID,IOS,IOSSA)
0246      D         IF(STATUS.NE.0)GOTO 10
0247      D         INSTR=1150
0248                STATUS=MPEFL(FL4)
0249      D         IF(STATUS.NE.0)GOTO 10
          C
          C         LIST "TIMER": THE ANALYZER/SYNTHESIZER TIMER LOOP
0250      D         INSTR=1280
0251                STATUS=MPBFL(TIMER)
0252      D         IF(STATUS.NE.0)GOTO 10
0253      D         INSTR=1285
0254                STATUS=MPIIF(0,EQ,0,ATCANA,FL0)
0255      D         IF(STATUS.NE.0)GOTO 10
0256      D         INSTR=1286
0257                STATUS=MPIIF(1,EQ,1,ATCSYN,FL0)
0258      D         IF(STATUS.NE.0)GOTO 10
0259      D         INSTR=1290
0260                STATUS=MPEFL(FL7)
0261      D         IF(STATUS.NE.0)GOTO 10
0262                TYPE 101
0263      101       FORMAT(1X,'      (3) FUNCTION LISTS DEFINED!')
0264                RETURN
          C
          C         DIAGNOSTIC TRAP AREA
          C
0265      10        TYPE 100,INSTR,STATUS
0266                CALL EXIT
0267      100       FORMAT(1X,'***MAP ERROR*** "DEFINE" INSTR=',I3,' HAS STATUS=',I6/)
0268                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	003320	872	RW,I,CON,LCL
SPDATA	000150	52	RW,D,CON,LCL
$IDATA	000714	230	RW,D,CON,LCL
$VARS	000266	91	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRD	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 031674 6622

```
NO FPP INSTRUCTIONS GENERATED

DEFINE,LP/LI:1=DEFINE/DE/NOTR
```

```
        C       PROGRAM NAME:SETUP.FTN  ORIGINATED:28-APR-80
        C                                         UPDATE:09-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE SETUP
0002            REAL IOSHA,IOSSA
0003            INTEGER IOSPMH(600),PROGRM(494),WORD
0004            LOGICAL*1 CWORD(4),HEXC(16)
0005            INTEGER AOMPM,ADAMPM
0006            INTEGER DUAL,EXT,DAFLTP,DAFIXP,EXTT,P2DIS,P2EN
                1 ,CC0FSR,CC0SSR,CC1FSR,CC1SSR,CC2FSR,CC2SSR
                2 ,CC3FSR,CC3SSR,CHANS1(2),DDFFLT,DDFFIX,OFFSET
0007            INTEGER BUS1,BUS2,BUS3
0008            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTER,CNVYES,CNVNO,UNITY,STATUS,SHORT
0009            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0010            INTEGER ORDR,START,SIZE,DSW,BTLTH
0011            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0012            COMMON/MTAPE0/NIN(300),NOUT(300)
0013            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0014            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0015            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0016            COMMON/OVRO/Y(256),NP,XN
0017            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0018            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0019            COMMON/OVRP/M,G,VU,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0020            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0021            COMMON/OVR2/IORDR(256),LTHM1
0022            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0023            COMMON/OVRE/XR(512)
0024            COMMON/OVRD/CSN,START,SIZE,YES,NO
0025            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

```
0026               EQUIVALENCE (IOSPMB(1),XR(1)),(PROGRM(1),OCT2(1)),(MSGERR,ITOT)
0027               DATA REAL,CMPLX,INTGR/0,1,2/
0028               DATA EVERY,SINGLE,DOUBLE/1,2,3/
0029               DATA BYTE2,BYTE4,BYTE8/2,4,8/
0030               DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0031               DATA BUS1,BUS2,BUS3/64,128,192/
0032               DATA MONO,DUAL,INT,EXT,DAFLTP,DAFIXP/0,1,0,2,0,4/
0033               DATA CC0FSR,CC0SSR,CC1FSR,CC1SSR/0,8,0,16/
0034               DATA CC2FSR,CC2SSR,CC3FSR,CC3SSR/0,32,0,64/
0035               DATA DDFFLT,DDFFIX/0,128/
0036               DATA OFFSET,INTT,EXTT/2,0,1/
0037               DATA P2DIS,P2EN/0,4/
0038               DATA CHANS1/1,-1/
0039               DATA IOSPMB,OVRHD/600*0,12./
0040               DATA IOSPM,IOS,IOSBA,IOSSA/61,2,22100.,0./
0041               DATA AOMPM,AOMBA,AOMSA,AOMSZ/62,22700.,0.,512./
0042               DATA ADAMPM,ADAMBA,ADAMSA,ADAMSZ/63,23300.,0.,512./
0043               DATA HEXC/'0','1','2','3','4','5','6','7','8','9',
                   1'A','B','C','D','E','F'/
0044               DATA CWORD/'E','C','C','4'/
          C
          C        SET UP IOS-2(MODEM SCROLL)
          C
0045               CALL ASSIGN(3,'SY:LINE.PBJ')
0046               CALL LOAD
0047               IF(MSGERR.EQ.0)GO TO 2000
0048               TYPE 2001
0049      2001     FORMAT(1X,'***FATAL: READ ERROR ON "LINE.PBJ" ***'//)
0050               STOP
0051      2000     CONTINUE

          C        IOSM(IOS-2 SCROLL)
0052               CALL IOSM
          C
          C        AOM(D/A SCROLL)
0053               CALL AOM
          C
          C        ADAM(A/D SCROLL)
0054               CALL ADAM
0055               RETURN
          C
          C        DIAGNOSTIC TRAP AREA
          C
0056      10       TYPE 100,INSTR,STATUS
0057               CALL EXIT
0058      100      FORMAT(1X,'***MAP ERROR*** "SETUP" INSTR=',I3,' HAS STATUS=',I6/)
0059               END
```

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PROGRAM SECTIONS

 NAME        SIZE                    ATTRIBUTES

$CODE1  000106     35               RW,I,CON,LCL
$PDATA  000020      8               RW,D,CON,LCL
$IDATA  000152     53               RW,D,CON,LCL
$VARS   000232     77               RW,D,CON,LCL
MTAPE0  002260    600               RW,D,OVR,GBL
MTAPE1  000012      5               RW,D,OVR,GBL
MTAPE2  000012      5               RW,D,OVR,GBL
OVRI    002020    520               RW,D,OVR,GBL
OVRO    002006    515               RW,D,OVR,GBL
OVRF    006016   1543               RW,D,OVR,GBL
OVRA    000152     53               RW,D,OVR,GBL
OVRP    002022    521               RW,D,OVR,GBL
OVRB    005004   1282               RW,D,OVR,GBL
OVR2    001002    257               RW,D,OVR,GBL
OVRL    000016      7               RW,D,OVR,GBL
OVRD    000012      5               RW,D,OVR,GBL
MAPDEF  000200     64               RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025534  5550

NO FPP INSTRUCTIONS GENERATED
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SETUP.LP/LI:1=SETUP/DE/NOTR

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FORTRAN IV-PLUS V02-51F          13:28:58    09-AUG-80             PAGE 1
LOAD.FTN          /WR

        C      PROGRAM NAME:LOAD.FTN            ORIGINATED:18-APR-79
        C                                                UPDATED:02-MAY-80
        C      THIS PROGRAM READS THE MAP-300 ASSEMBLED OBJECT CODE,
        C      *.PBJ, AND RETAINS ONLY THE PM INSTRUCTIONS IN THE
        C      CALLING ARRAY.
        C
0001           SUBROUTINE LOAD
0002           INTEGER ORDR,START,SIZE,DSW,BTLTH
0003           COMMON/OVRH/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0004           COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0005           COMMON/OVRD/CSN,START,SIZE,YES,NO
0006           LOGICAL*1 M,DDL(2),ZERO,H(68),N(2),K(78),L(6),F(2),REM(78)
               1,PBJ(3),DMP(3),ASCII1,ASCII2,ASCII3,ASCII4,ONE,HEXC(16),S(4,5)
0007           INTEGER DT,DD(23),PM(1),ADDR,VALUE
               1,APU,APS,HIM,IOS2,UNKN,PROC
0008           EQUIVALENCE (DT,DDL)
        C      EQUIVALENCE VARIABLES SUCH THAT PM->DCT2
        C                                             SIZE->TTY
        C                                             IERR->ITOT
0009           EQUIVALENCE (PM(1),DCT2(1)),(MSGERR,ITOT)
0010           DATA S(1,1),S(2,1),S(3,1),S(4,1)/'A','P','U',' '/
0011           DATA S(1,2),S(2,2),S(3,2),S(4,2)/'A','P','S',' '/
0012           DATA S(1,3),S(2,3),S(3,3),S(4,3)/'H','I','M',' '/
0013           DATA S(1,4),S(2,4),S(3,4),S(4,4)/'I','O','S','2'/
0014           DATA S(1,5),S(2,5),S(3,5),S(4,5)/'?','?','?','?'/
0015           DATA HEXC/'0','1','2','3','4','5','6','7','8'
               1,'9','A','B','C','D','E','F'/
0016           DATA ASCII1,ASCII2,ASCII3,ASCII4/'1','2','3','4'/
0017           DATA APU,APS,HIM,IOS2,UNKN/1,2,3,4,5/
0018           DATA DD/'00','01','02','10'
               1,'11','12','13','14','15','16','17','18','19'
               2,'1A','1B','1C','1D','1E'
               3,'1F','20','21','22','FF'/
0019           DATA DMP/'D','M','P'/
0020           DATA PBJ/'P','B','J'/
        C
        C      READ DATA DESIGNATOR,2 BYTES
        C
0021           ADDR=1
0022           IERR=0
0023           LINE=0
0024    5      READ(3,103,END=2000,ERR=2001)DDL(1),DDL(2)
0025           LINE=LINE+1
        C
        C      RECOGNIZE AND CLASSIFY
        C
0026           DO 10 I=1,23
0027           IF(DT.EQ.DD(I))GO TO 20
0028    10     CONTINUE
        D      TYPE 100,DT,LINE
0029           IERR=1
0030           GO TO 3000
0031    20     INDEX=1
0032           BACKSPACE 3
0033           GO TO (30,31,32,33,34,34,34,34,34,34,34,34
               1,34,34,34,34,34,34,35,36,37,38,39)INDEX
```

```
            C******
            C       DD=00,NULL BYTE
            C******
0034        30      LEFT=78
0035                READ(3,116)DT,(REM(I),I=1,LEFT)
            D       PRINT 113,LINE,DT
0036                GO TO 5
            C******
            C       DD=01,SET BUS BITS
            C******
0037        31      LEFT=76
0038                READ(3,116)DT,ZERO,M,(REM(I),I=1,LEFT)
            D       PRINT 113,LINE,DT,ZERO,M
0039                GO TO 5
            C******
            C       DD=02,SET ADDRESS ON BUS
            C******
0040        32      LEFT=72
0041                READ(3,116)DT,ZERO,(H(I),I=1,5),(REM(I),I=1,LEFT)
            D       PRINT 113,LINE,DT,ZERO,(H(I),I=1,5)
0042                LADDR=0
0043                DO 46 J=1,5
0044                DO 45 I=1,16
0045                IF(H(J).EQ.HEXC(I))GO TO 46
0046        45      CONTINUE
            D       TYPE 112,DT,H(J),LINE
0047                IERR=1
0048                GO TO 3000
0049        46      LADDR=LADDR+(16.**(5-J))*(I-1)
0050                GO TO 5
            C******
            C       DD=10,PROGRAM HEADER
            C******
0051        33      LEFT=0
0052                READ(3,116)DT,(K(I),I=1,78)
            D       PRINT 113,LINE,DT,(K(I),I=1,78)
            DD      TYPE 104,(K(I),I=1,78)
0053                GO TO 5
            C******
            C       DD=12,MODULE HEADER
            C******
0054        34      LEFT=0
0055                READ(3,103)ONE,H(1),(L(I),I=1,6),(K(I),I=1,72)
            D       PRINT 114,LINE,ONE,H(1),(L(I),I=1,6),(K(I),I=1,72)
0056                IF(H(1).EQ.ASCII1)PROC=APU
0057                IF(H(1).EQ.ASCII2)PROC=APS
0058                IF(H(1).EQ.ASCII3)PROC=HIM
0059                IF(H(1).EQ.ASCII4)PROC=IOS2
0060                IF(H(1).GT.ASCII4)PROC=UNKN
            D       TYPE 106,(S(I,PROC),I=1,4)
            D       TYPE 107,(L(I),I=1,6)
0061                GO TO 5
            C******
            C       DD=1F,MODULE END
            C******
0062        35      LEFT=0
```

```
0063                READ(3,117)DT,(H(I),I=1,4)
          D         PRINT 113,LINE,DT,(H(I),I=1,4)
          D         TYPE 108
0064                GO TO 5
          C*****
          C         DD=20,DATA OR INSTRUCTION
          C*****
0065      36        LEFT=0
0066                READ(3,105)DT,(N(I),I=1,2)
          D         PRINT 119,LINE,DT,(N(I),I=1,2)
0067                NUMWRD=0
0068                DO 41 J=1,2
0069                DO 40 I=1,16
0070                IF(N(J).EQ.HEXC(I))GO TO 41
0071      40        CONTINUE
          D         TYPE 112,DT,N(J),LINE
0072                GO TO 3000
0073      41        NUMWRD=NUMWRD+(16.**(2-J))*(I-1)
0074                NUMHEX=NUMWRD*4
0075                IF(NUMWRD.EQ.0)GO TO 5
0076                BACKSPACE 3
0077                READ(3,116)DT,(N(I),I=1,2),(H(I),I=1,NUMHEX)
0078                DO 43 II=1,NUMWRD
0079                XVALUE=0.0
0080                IBASE=(II-1)*4
0081                DO 44 J=1,4
0082                JJ=IBASE+J
0083                DO 42 I=1,16
0084                IF(H(JJ).EQ.HEXC(I))GO TO 44
0085      42        CONTINUE
          D         TYPE 112,DT,H(JJ),LINE
0086                IERR=1
0087                GO TO 3000
0088      44        XVALUE=XVALUE+(16.**(4-J))*(I-1)
0089                IF(XVALUE.LE.32767.0)GO TO 440
0090                XVALUE=XVALUE-65536.0
0091      440       VALUE=IFIX(XVALUE)
          D         PRINT 120,(S(I,PROC),I=1,4),ADDR,(H(IBASE+I),I=1,4),VALUE
0092                PM(ADDR)=VALUE
0093      43        ADDR=ADDR+1
0094                GO TO 5
          C*****
          C         DD=21,REPEATED 16 BIT DATA
          C*****
0095      37        LEFT=72
0096                READ(3,116)DT,(N(I),I=1,2),(H(I),I=1,4),(REM(I),I=1,LEFT)
          D         PRINT 113,LINE,DT,(N(I),I=1,2)
0097                GO TO 5
          C*****
          C         DD=22,REPEATED 32 BIT DATA
          C*****
0098      38        LEFT=68
0099                READ(3,116)DT,(N(I),I=1,2),(H(I),I=1,8),(REM(I),I=1,LEFT)
          D         PRINT 113,LINE,DT,(N(I),I=1,2)
0100                GO TO 5
          C*****
```

```
          C         DD=FF,PROGRAM END
          C*****
0101      39        LEFT=76
0102                READ(3,116)DT,(F(I),I=1,2),(REM(I),I=1,LEFT)
          D         PRINT 113,LINE,DT,(F(I),I=1,2)
          D         TYPE 111,LINE,ADDR-1
0103                SIZE=ADDR-1
0104                GO TO 3000
          C
          C         FILE STRUCTURE PROBLEMS
          C
0105      2000      TYPE 109
0106                GO TO 3000
0107      2001      TYPE 110
0108                GO TO 3000
          C
          C         NORMAL EXIT
          C
0109      3000      CALL CLOSE(3)
0110                END FILE 6
0111                RETURN
          C
          C         FORMAT DECLARATIONS
          C
          D100      FORMAT(1X,'*** DD ERROR *** DT =',A2,' IN LINE ',I4/)
          D101      FORMAT(1H$,'"PRJ" FILE TO BE READ =')
          D102      FORMAT(1H$,'"DMP" FILE TO BE SAVED =')
0112      103       FORMAT(80A1)
          D104      FORMAT(//1X,'PROGRAM HEADER: ',80A1)
0113      105       FORMAT(A2,2A1)
          DD106     FORMAT(1X,'SUB-PROCESSOR TYPE: ',4A1)
          D107      FORMAT(1X,'SUB-PROCESSOR MODULE HEADER: ',6A1)
          D108      FORMAT(1X,'END OF SUB-PROCESSOR MODULE!')
0114      109       FORMAT(1X,'*** EOF BEFORE PROGRAM END FOUND ***')
0115      110       FORMAT(1X,'*** PRJ FILE STRUCTURE ERROR ***')
          D111      FORMAT(1X,'PROGRAM ENDS W/ LINE ',I4,' & LAST PC=',I8//)
          D112      FORMAT(1X,'***HEX CHAR. IS ?*** DT=',A2,' ?=',A1,' IN LINE ',I4/)
          D113      FORMAT(1X,'LINE=',I4,' DATA DESCRIPTOR=',1X,A2,' CODE=',80A1)
          D114      FORMAT(1X,'LINE=',I4,' DATA DESCRIPTOR=',1X,A1,A1,' CODE=',80A1)
0116      116       FORMAT(A2,78A1)
0117      117       FORMAT(A2,4A1)
          D119      FORMAT(1X,'LINE=',I4,' DATA DESCRIPTOR=',1X,A2,' LENGTH=',2A1)
          D120      FORMAT(1X,4A1,1X,'PM(',I3,')= H:',4A1,2X,'D:',I6)
0118                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	003030	780	RW,I,CON,LCL
$PDATA	000070	28	RW,D,CON,LCL
$IDATA	000146	51	RW,D,CON,LCL
$VARS	000574	190	RW,D,CON,LCL
$TEMPS	000002	1	RW,D,CON,LCL
OVRB	005004	1282	RW,D,OVR,GBL

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OVRL     000016      7            RW,D,OVR,GBL
OVRD     000016      7            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 011124  2346

LOAD,LP/LI:1=LOAD/NOTR
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```
        C       PROGRAM NAME:IOSM.FTN   ORIGINATE  28-APR-80
        C                                      UPDATE:20-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE IOSM
0002            REAL IOSBA,IOSSA
0003            INTEGER IOSPMB(600),PROGRM(494),WORD
0004            LOGICAL*1 CWORD(4),HEXC(16)
0005            INTEGER AOMPM,ADAMPM
0006            INTEGER DUAL,EXT,DAFLTP,DAFIXP,EXTI,P2DIS,P2EN
                1 ,CC0FSR,CC0SSR,CC1FSR,CC1SSR,CC2FSR,CC2SSR
                2 ,CC3FSR,CC3SSR,CHANS1(2),DDFFLT,DDFFIX,OFFSET
0007            INTEGER BUS1,BUS2,BUS3
0008            INTEGER REAL,CMPLX,INTGP,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0009            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0010            INTEGER ORDR,START,SIZE,DSW,BTLTH
0011            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0012            COMMON/4TAPEO/NIN(300),NOUT(300)
0013            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0014            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0015            COMMON/OVR1/LIH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0016            COMMON/OVRO/Y(256),NF,XN
0017            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0018            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0019            COMMON/OVRP/M,G,V0,PFFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0020            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0021            COMMON/OVR2/IORDR(256),LTHM1
0022            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0023            COMMON/OVRE/XR(512)
0024            COMMON/OVRD/CSW,START,SIZE,YES,NO
0025            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

```
0026            EQUIVALENCE (IOSPMB(1),XR(1)),(PROGRM(1),DCT2(1)),(MSGERR,ITOT)
0027            DATA REAL,CMPLX,INTGR/0,1,2/
0028            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0029            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0030            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0031            DATA BUS1,BUS2,BUS3/64,128,192/
0032            DATA WORD,DUAL,INT,EXT,DAFLTP,DAFIXP/0,1,0,2,0,4/
0033            DATA CC0FSR,CC0SSR,CC1FSR,CC1SSR/0,8,0,16/
0034            DATA CC2FSR,CC2SSR,CC3FSR,CC3SSR/0,32,0,64/
0035            DATA DUFFLT,DUFFIX/0,128/
0036            DATA OFFSET,INIT,EXIT/2,0,1/
0037            DATA P2DIS,P2EN/0,4/
0038            DATA CHANS1/1,-1/
0039            DATA IOSPMB,OVRHD/600*0,12./
0040            DATA IOSPM,IOS,IOSBA,IOSSA/61,2,22100.,0./
0041            DATA AOMPM,AOMBA,AOMSA,AOMSZ/62,22700.,0.,512./
0042            DATA ADAMPM,ADAMBA,ADAMSA,ADAMSZ/63,23300.,0.,512./
0043            DATA HEXC/'0','1','2','3','4','5','6','7','8','9',
                1'A','B','C','D','E','F'/
0044            DATA CWORD/'E','C','C','4'/
          C
          C     IOS-2 HEADER BLOCK DEFINITION
          C
0045            PMSIZE=SIZE
0046            IOSPMB(1)=SIZE
0047            IOSPMB(2)=SEN2*256+SEN1
0048            DO 2002 WORD=1,SIZE
0049      2002  IOSPMB(WORD+2)=PROGRM(WORD)
          C     DATA TRANSFER
0050            IOSPMB(SIZE+2+1)=0
          C     CHANNELS + BUFFER SIZE
0051            IOSPMB(SIZE+2+2)=2
0052            IOSPMB(SIZE+2+3)=RECV2*256+RECV1
          C     # OF SCROLL REGISTER TO LOAD
0053            IOSPMB(SIZE+2+4)=0
          C     FIRST SCROLL REGISTER
0054            IOSPMB(SIZE+2+5)=0
          C     OFFSET IDENTIFIER
0055            IOSPMB(SIZE+2+6)=-1
          C     CHAIN ANCHORS
0056            IOSPMB(SIZE+2+7)=-1
0057            IOSPMB(SIZE+2+8)=-1
0058            IOSPMB(SIZE+2+9)=-1
0059            IOSPMB(SIZE+2+10)=-1
          C
          C     SET SPEECH SIDE & LINE SIDE INTERRUPT RATES
          C
0060            INSTR=1000
          C1000 TYPE 1001
          C1001 FORMAT(1HS,'HEX CODE FOR SPI= ')
          C     READ(5,1002,END=10,ERR=1000)CWORD
          C1002 FORMAT(4A1)
          C     DATUM=0.
          C     DO 2004 J=1,4
          C     DO 2005 I=1,16
          C     IF(CWORD(J).EQ.HEXC(I))GOTO 2006
```

```
          C2005    CONTINUE
          C        TYPE 2003
          C2003    FORMAT(1X,'***FATAL: ILLEGAL CHARACTER IN ICW ***'//)
          C        STOP
          C2006    DATUM=DATUM+(16.0**(4-J))*(I-1)
          C2004    CONTINUE
          C        IF(DATUM.GT.32767.)DATUM=DATUM-65536.
          C        IOSPMB(4)=IFIX(DATUM)
          C        HEX ECC4 TO CLOCKS
0061               IOSPMB(4)=-4924
          C
          C        DEFINE IOS PROGRAM MEMORY BUFFER
          C
          C        IOS-2(MODEM SCROLL)
0062      D        INSTR=1000
0063               STATUS=MPCLB(BUS1+IOSPM,IOSBA,PMSIZE+OVRHD,INTGR,EVERY,LONG)
0064      D        IF(STATUS.NE.0)GOTO 10
          C
          C        WRITE IOS PROGRAM INTO BUS1 AREAS
          C
          C        IOS-2(MODEM SCROLL)
0065      D        INSTR=2000
0066               IOVRHD=IFIX(OVRHD)
0067               STATUS=MPWDB(IOSPM,IOSPMB(1),BYTE2,CNVRO,IOSPMB(SIZE+IOVRHD))
0068      D        IF(STATUS.NE.0)GOTO 10
0069               TYPE 101
0070      101      FORMAT(1X,'     (4) IOS-2 SETUP COMPLETE!')
0071               RETURN
          C
          C        DIAGNOSTIC TRAP AREA
          C
0072      10       TYPE 100,INSTR,STATUS
0073               CALL EXIT
0074      100      FORMAT(1X,'***MAP ERROR*** "IOSM" INSTR=',I4,' HAS STATUS=',I6/)
0075               END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000622	201	RW,I,CON,LCL
$IDATA	000156	55	RW,D,CON,LCL
$VARS	000240	80	RW,D,CON,LCL
$TEMPS	000002	1	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL

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FORTRAN IV-PLUS V02-51E          21:18:21    11-SEP-80           PAGE 4
IOSM.FTN         /DE/AR

OVRD     000012     5            RW,D,OVR,GBL
MAPDEF   000200    64            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026244  5714

IOSM,LP/LI:1=IOSM/DE/NOTR
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FORTRAN IV-PLUS V02-51F          13:29:19     09-AUG-80            PAGE 1
AOM.FTN                 /WR

        C       PROGRAM NAME:AOM.FTN     ORIGINATED:28-APR-80
        C                                         UPDATE:20-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE AOM
0002            REAL IOSBA,IOSSA
0003            INTEGER IOSPMB(600),PROGRM(494),WORD
0004            LOGICAL*1 CWORD(4),HEXC(16)
0005            INTEGER AOMPM,ADAMPM
0006            INTEGER DUAL,EXT,DAFLTP,DAFIXP,EXTT,P2DIS,P2EN
                1 ,CC0FSR,CC0SSR,CC1FSR,CC1SSR,CC2FSR,CC2SSR
                2 ,CC3FSR,CC3SSR,CHANS1(2),DDFFLT,DDFFIX,OFFSET
0007            INTEGER BUS1,BUS2,BUS3
0008            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0009            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0010            INTEGER ORDR,START,SIZE,DSW,BTLTH
0011            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0012            COMMON/MTAPE0/NIN(300),NOUT(300)
0013            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0014            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0015            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0016            COMMON/OVRO/Y(256),NP,XN
0017            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0018            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0019            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0020            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0021            COMMON/OVR2/IORDR(256),LTHM1
0022            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0023            COMMON/OVRF/XR(512)
0024            COMMON/OVRD/CSN,START,SIZE,YES,NO
0025            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

```
0026               EQUIVALENCE (IOSPMB(1),XR(1)),(PROGRM(1),DCT2(1))
0027               DATA REAL,CMPLX,INTGR/0,1,2/
0028               DATA EVERY,SINGLE,DOUBLE/1,2,3/
0029               DATA BYTE2,BYTE4,BYTE8/2,4,8/
0030               DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0031               DATA BUS1,BUS2,BUS3/64,128,192/
0032               DATA MONO,DUAL,INT,EXT,DAFLTP,DAFIXP/0,1,0,2,0,4/
0033               DATA CC0FSR,CC0SSR,CC1FSR,CC1SSR/0,8,0,16/
0034               DATA CC2FSR,CC2SSR,CC3FSR,CC3SSR/0,32,0,64/
0035               DATA DDFFLT,DDFFIX/0,128/
0036               DATA OFFSET,INTT,EXTT/2,0,1/
0037               DATA P2DIS,P2EN/0,4/
0038               DATA CHANS1/1,-1/
0039               DATA IOSPMB,OVRHD/600*0,12./
0040               DATA IOSPM,IOS,IOSBA,IOSSA/61,2,22100.,0./
0041               DATA AOMPM,AOMBA,AOMSA,AOMSZ/62,22700.,0.,512./
0042               DATA ADAMPM,ADAMBA,ADAMSA,ADAMSZ/63,23300.,0.,512./
0043               DATA HEXC/'0','1','2','3','4','5','6','7','8','9',
                   1'A','B','C','D','E','F'/
          C
          C        AOM(D/A SCROLL)
          D        INSTR=1001
0044               STATUS=MPCLB(BUS1+AOMPM,AOMBA,AOMSZ,INTGR,EVERY,LONG)
          D        IF(STATUS.NE.0)GOTO 10
          C
          C        AOM(D/A SCROLL)
0045               KNTRL=MONO+DAFIXP+EXT
0046               FREQ=1.0
          D        INSTR=2010
0047               STATUS=AOMID(AOMPM,FREQ,KNTRL,NOUT1,NOUT2,OFFSET)
          D        IF(STATUS.NE.0)GOTO 10
0048               TYPE 101
0049      101      FORMAT(1X,'     (5) AOM SETUP COMPLETE!')
0050               RETURN
          C
          C        DIAGNOSTIC TRAP AREA
          C
0051      10       TYPE 100,INSTR,STATUS
0052               CALL EXIT
0053      100      FORMAT(1X,'***MAP ERROR*** "AOM" INSTR=',I3,' HAS STATUS=',I6/)
0054               END
```

PROGRAM SECTIONS

```
 NAME        SIZE                  ATTRIBUTES

$CODE1  000136     47              RW,I,CON,LCL
$IDATA  000156     55              RW,D,CON,LCL
$VARS   000240     80              RW,D,CON,LCL
*TAPE0  002260    600              RW,D,OVR,GBL
*TAPE1  000012      5              RW,D,OVR,GBL
*TAPE2  000012      5              RW,D,OVR,GBL
OVRI    002020    520              RW,D,OVR,GBL
OVRO    002006    515              RW,D,OVR,GBL
OVRF    006016   1543              RW,D,OVR,GBL
OVRA    000152     53              RW,D,OVR,GBL
OVRP    002022    521              RW,D,OVR,GBL
OVRB    005004   1282              RW,D,OVR,GBL
OVR2    001002    257              RW,D,OVR,GBL
OVRL    000016      7              RW,D,OVR,GBL
OVRD    000012      5              RW,D,OVR,GBL
MAPDEF  000200     64              RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025556  5559
```

```
AOM.LP/LI:1=AOM/NOTR
```

```
FORTRAN IV-PLUS V02-51F          13:29:26     09-AUG-80            PAGE 1
ADAM.FTN              /WR

        C       PROGRAM NAME:ADAM.FTN    ORIGINATED:28-APR-80
        C                                           UPDATE:20-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE ADAM
0002            REAL IOSBA,IOSSA
0003            INTEGER IOSPMB(600),PROGRM(494),WORD
0004            LOGICAL*1 CWORD(4),HEXC(16)
0005            INTEGER AOMPM,ADAMPM
0006            INTEGER DUAL,EXT,DAFLTP,DAFIXP,EXTT,P2DIS,P2EN
                1 ,CCOFSR,CCOSSR,CC1FSR,CC1SSR,CC2FSR,CC2SSR
                2 ,CC3FSR,CC3SSR,CHANS1(2),DDFFLT,DDFFIX,OFFSET
0007            INTEGER BUS1,BUS2,BUS3
0008            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0009            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0010            INTEGER ORDR,START,SIZE,DSW,BTLTH
0011            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0012            COMMON/MTAPE0/NIN(300),NOUT(300)
0013            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0014            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0015            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0016            COMMON/OVRO/Y(256),NP,XN
0017            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0018            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0019            COMMON/OVRP/M,G,V0,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0020            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0021            COMMON/OVR2/IORDR(256),LTHM1
0022            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0023            COMMON/OVRF/XR(512)
0024            COMMON/OVRD/CSN,START,SIZE,YES,NO
0025            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

```
0026              EQUIVALENCE (IOSPMB(1),XR(1)),(PROGRM(1),DCT2(1))
0027              DATA REAL,CMPLX,INTGR/0,1,2/
0028              DATA EVERY,SINGLE,DOUBLE/1,2,3/
0029              DATA BYTE2,BYTE4,BYTE8/2,4,8/
0030              DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0031              DATA BUS1,BUS2,BUS3/64,128,192/
0032              DATA MONO,DUAL,INT,EXT,DAFLTP,DAFIXP/0,1,0,2,0,4/
0033              DATA CC0FSR,CC0SSR,CC1FSR,CC1SSR/0,8,0,16/
0034              DATA CC2FSR,CC2SSR,CC3FSR,CC3SSR/0,32,0,64/
0035              DATA DDFFLT,DDFFIX/0,128/
0036              DATA OFFSET,INTT,EXTT/2,0,1/
0037              DATA P2DIS,P2EN/0,4/
0038              DATA CHANS1/1,-1/
0039              DATA IOSPMB,OVRHD/600*0,12./
0040              DATA IOSPM,IOS,IOSBA,IOSSA/61,2,22100.,0./
0041              DATA AOMPM,AOMBA,AOMSA,AOMSZ/62,22700.,0.,512./
0042              DATA ADAMPM,ADAMBA,ADAMSA,ADAMSZ/63,23300.,0.,512./
0043              DATA HEXC/'0','1','2','3','4','5','6','7','8','9',
                  1'A','B','C','D','E','F'/
          C
          C       ADAM(A/D SCROLL)
          D       INSTR=1002
0044              STATUS=MPCLB(BUS1+ADAMPM,ADAMBA,ADAMSZ,INTGR,EVERY,LONG)
          D       IF(STATUS.NE.0)GOTO 10
          C
          C       ADAM(A/D SCROLL)
0045              KNTRL=DDFFIX+CC0SSR+CC1FSR+CC2SSR+CC3SSR
0046              KNTRL=KNTRL+INTT+P2DIS
0047              FREQ=1.
0048              KNTRL=KNTRL+EXT
0049              FREQ1=FREQ
0050              FREQ2=FREQ
          D       INSTR=2005
0051              STATUS=ADMSD(ADAMPM,FREQ1,FREQ2,KNTRL,CHANS1,NIN1,NIN2)
          D       IF(STATUS.NE.0)GOTO 10
0052              TYPE 101
0053      101     FORMAT(1X,'     (6) ADAM SETUP COMPLETE!')
0054              RETURN
          C
          C       DIAGNOSTIC TRAP AREA
          C
0055      10      TYPE 100,INSTR,STATUS
0056              CALL EXIT
0057      100     FORMAT(1X,'***MAP ERROR*** "ADAM" INSTR=',I3,' HAS STATUS=',I6/)
0058              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000176	63	RW,I,CON,LCL
$IDATA	000162	57	RW,D,CON,LCL
$VARS	000250	84	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025632   5581

```
ADAM,LP/LI:1=ADAM/NOTR
```

```
           C        PROGRAM NAME:SYSTEM.FTN ORIGINATED:13-FEB-80
           C                                          UPDATE:22-MAY-80
           C
           C
           C
           C
0001                SUBROUTINE SYSTEM
0002                INTEGER ADM,ADAM,ADMPM,ADAMPM
0003                INTEGER EQ,GE,GT,SYNCNT,ANA,AFLG,SYN,SFLG,RDATA,XDATA
                    1, SPIN,SPOUT,PARITY
0004                INTEGER ATCANA,ATCSYN,WAIT,STRTUP,TIMER
0005                INTEGER BUS1,BUS2,BUS3
0006                INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                    1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0007                INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                    1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                    2,ORDCTM,YNM
                    3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                    4,MIBIT,DCTM,QPRM,QTDCTM
                    5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                    6,RECV1,RECV2,SEN1,SEN2
                    7,AQPB,AQTDCT,AIBIT,SEN,INPB
                    8,SYNB1,SYNB2,BF1,BF2,OUTB
                    9,RECV,ARQPB,ARQDCT,RIBIT
                    1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
0008                LOGICAL*1 BELL(5),ARRAY1(9),ARRAY2(8)
           C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0009                INTEGER ORDR,START,SIZE,DSW,BTLTH
0010                LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO,CR
0011                COMMON/MTAPE0/NIN(300),NOUT(300)
0012                COMMON/MTAPE1/NSKIP,IST,NTOT1,NTOPS,NTOTO
0013                COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0014                COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0015                COMMON/OVRO/Y(256),NP,XN
0016                COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0017                COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0018                COMMON/OVRP/M,G,V0,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0019                COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0020                COMMON/OVP2/IORDR(256),LTHM1
0021                COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0022                COMMON/OVRF/XR(512)
0023                COMMON/OVRD/CSN,START,SIZE,YES,NO
0024                COMMON/MAPOFF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                    1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                    2,ORDCTM,YNM
                    3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                    4,MIBIT,DCTM,QPRM,QTDCTM
                    5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                    6,RECV1,RECV2,SEN1,SEN2
                    7,AQPB,AQTDCT,AIBIT,SEN,INPB
                    8,SYNB1,SYNB2,BF1,BF2,OUTB
                    9,RECV,ARQPB,ARQDCT,RIBIT
                    1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
           C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0025                DATA REAL,CMPLX,INTGR/0,1,2/
0026                DATA EVERY,SINGLE,DOUBLE/1,2,3/
```

```
0027            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0028            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0029            DATA BUS1,BUS2,BUS3/64,128,192/
0030            DATA ATCANA,ATCSYN,WAIT,STRTUP,TIMER/1,2,3,4,7/
0031            DATA IOSTD,AOM,ADAM/16,22,23/
0032            DATA EQ,NE,GE,GT,LE,LT/0,1,2,3,4,5/
0033            DATA INIT,PARITY/113,114/
0034            DATA CR,BELL/040,5*07/
        C
        C       EXECUTE PRE-BOUND FUNCTION LIST
        C
0035            IF(RETIM.EQ.NO.AND.LIVE.EQ.NO)RETURN
0036            IF(TIMING.EQ.NO)GO TO 1
        C>>>>>> FOR TIMING PURPOSES ONLY!
0037    D       INSTR=0
0038            STATUS=MPWHL(PARITY,EQ,TIMER)
0039    D       IF(STATUS.NE.0)GO TO 10
0040            CALL DATE(ARRAY1)
0041            CALL TIME(ARRAY2)
0042    3       TYPE 20,BELL,ARRAY1,ARRAY2
0043    20      FORMAT(//1X,'PDP <==> MAP LINKAGE HAS BEEN SUSPENDED',5A1,/
                1,4X,9A1,' AT ',8A1/
                2,1X,'TYPE "RES ATCA" TO TERMINATE'//)
0044            CALL SUSPND
0045            GO TO 1000
        C>>>>>> ANALYZER
0046    1       IF(LIVE.EQ.YES)GO TO 2
0047    D       INSTR=10
0048            STATUS=MPXFL(ATCANA)
0049    D       IF(STATUS.NE.0)GO TO 10
        C>>>>>> SYNTHESIZER
0050    D       INSTR=11
0051            STATUS=MPXFL(ATCSYN)
0052    D       IF(STATUS.NE.0)GO TO 10
0053            RETURN
        C>>>>>> REAL-TIME LIVE SYSTEM
0054    2       CONTINUE
0055    D       INSTR=2090
0056            STATUS=MPWHL(PARITY,EQ,WAIT)
0057    D       IF(STATUS.NE.0)GO TO 10
0058            CALL DATE(ARRAY1)
0059            CALL TIME(ARRAY2)
0060            TYPE 20,BELL,ARRAY1,ARRAY2
0061            CALL SUSPND
0062            INSTR=8002
0063            STATUS=MPSAA(AOM)
0064    D       IF(STATUS.NE.0)GO TO 10
0065    D       INSTR=8003
0066            STATUS=MPSAA(ADAM)
0067    D       IF(STATUS.NE.0)GO TO 10
0068    1000    CONTINUE
0069    D       INSTR=8004
0070            STATUS=MPDEL(ATCANA)
0071    D       IF(STATUS.NE.0)GO TO 10
0072    D       INSTR=8005
0073            STATUS=MPDEL(ATCSYN)
```

```
0074    D        IF(STATUS.NE.0)GO TO 10
0075    D        INSTR=8006
0076             STATUS=MPDEL(WAIT)
0077    D        IF(STATUS.NE.0)GO TO 10
0078    D        INSTR=8007
0079             STATUS=MPDEL(STRTUP)
0080    D        IF(STATUS.NE.0)GO TO 10
0081    D        INSTR=8008
0082             STATUS=MPCLS(0)
0083    D        IF(STATUS.NE.0)GO TO 10
0084             STOP
        C
        C        DIAGNOSTIC TRAP AREA
        C
0085    10       TYPE 100,INSTR,STATUS
0086             CALL EXIT
0087    100      FORMAT(1X,'***MAP ERROR*** "SYSTEM" INSTR=',I4,' HAS STATUS=',I6/)
0088             END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000670	220	RW,I,CON,LCL
$PDATA	000004	2	RW,D,CON,LCL
$IDATA	000346	115	RW,D,CON,LCL
$VARS	000170	60	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000174	62	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026430   5772

NO FPP INSTRUCTIONS GENERATED

SYSTMA,LP/LI:1=SYSTMA/DE/NOTR

```
        C       PROGRAM NAME:INPUT.FTN  ORIGINATED:05-FEB-79
        C                                         UPDATE:13-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE INPUT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRF/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       DATA INPUT
```

```
      C
            IF(ICOUNT)5012,5010,5012
      5010  NTOTI=NP
            NTUPS=NP
            CALL TAPE2(8)
            CALL TAPE2(1)
      D     INSTR=1
            STATUS=MPWDB(NINM,NIN(1),BYTE2,CNVYES,NIN(NP))
      D     IF(STATUS.NE.0)GO TO 10
      D     INSTR=2
            STATUS=VFLT(XOM,39,NINM,0)
      D     IF(STATUS.NE.0)GO TO 10
            NTOTI=LTH-NP
            NTUPS=LTH-NP
      5012  CALL TAPE2(1)
            IF(NEND.NE.0)GO TO 5000
            IF(NERR.NE.0)GO TO 5000
            ICOUNT=ICOUNT+1
            IF(ICOUNT.LT.START)GO TO 5012
            IF((ICOUNT-START+1).GT.IREC)GO TO 5000
      D     WRITE(6,899)ICOUNT
      D899  FORMAT(1H1,40(1H>),'TRANSMIT FRAME # ',I4,40(1H<))
      D     INSTR=11
            STATUS=MPWDB(NINM,NIN(1),BYTE2,CNVYES,NIN(NTOTI))
      D     IF(STATUS.NE.0)GO TO 10
      D     INSTR=13
            STATUS=VMOV(INPB,NINM)
      D     IF(STATUS.NE.0)GO TO 10
      D     INSTR=12
            STATUS=MPRDB(NINM,NIN(1),BYTE2,CNVYES,NIN(NTOTI))
            IF(STATUS.NE.0)GO TO 10
      D     WRITE(6,913)(I,NIN(I),I=1,NTOTI)
      D913  FORMAT(/1X,4(1X,'NIN(',I3,')=',I6,2X))
            RETURN
      C
      C     EOF ON INPUT,WRITE EOF
      C
      5000  NEND=1
            RETURN
      C
      C     DIAGNOSTIC TRAP AREA
      C
      10    TYPE 101,INSTR,STATUS
            CALL EXIT
      101   FORMAT(1X,'***MAP ERROR*** "INPUT" INSTR=',I3,' HAS STATUS=',I6/)
            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000622	201	RW,I,CON,LCL
$PDATA	000020	8	RW,D,CON,LCL
$IDATA	000230	76	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL

```
MTAPE0   002260   600        RW,D,OVR,GBL
MTAPE1   000012     5        RW,D,OVR,GBL
MTAPE2   000012     5        RW,D,OVR,GBL
OVRI     002020   520        RW,D,OVR,GBL
OVRO     002006   515        RW,D,OVR,GBL
OVRF     006016  1543        RW,D,OVR,GBL
OVRA     000152    53        RW,D,OVR,GBL
OVRP     002022   521        RW,D,OVR,GBL
OVRB     005004  1282        RW,D,OVR,GBL
OVR2     001002   257        RW,D,OVR,GBL
OVRL     000016     7        RW,D,OVR,GBL
OVRD     000012     5        RW,D,OVR,GBL
MAPDEF   000200    64        RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026150  5684

INPUT,LP/LI:1=INPUT/DE/NOTR
```

```
      C       PROGRAM NAME:DCVAR.FTN  ORIGINATED:05-FEB-79
      C                                     UPDATE:13-MAY-80
      C
      C
      C
      C
0001          SUBROUTINE DCVAR
0002          INTEGER BUS1,BUS2,BUS3
0003          INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
              1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004          INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,QRPRM,QRDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,QPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AQPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,ARQPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005          INTEGER ORDR,START,SIZE,DSW,BTLTH
0006          INTEGER QTDCT,QTPAR,QTDC,QTVAR,QTM,QTG,QTV
0007          LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008          COMMON/MTAPE0/NIN(300),NOUT(300)
0009          COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0010          COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011          COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012          COMMON/OVRO/Y(256),NP,XN
0013          COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014          COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015          COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016          COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017          COMMON/OVR2/IORDR(256),LTHM1
0018          COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019          COMMON/OVRF/XR(512)
0020          COMMON/OVRD/CSN,START,SIZE,YES,NO
0021          COMMON/OVRQT/QTDCT(256),QTPAR(8),QTDC,QTVAR,QTM,QTG,QTV
0022          COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,QRPRM,QRDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,QPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AQPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,ARQPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0023          DATA REAL,CMPLX,INTGR/0,1,2/
0024          DATA EVERY,SINGLE,DOUBLE/1,2,3/
0025          DATA BYTE2,BYTE4,BYTE8/2,4,8/
0026          DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0027          DATA BUS1,BUS2,BUS3/64,128,192/
```

```
        C
        C        SERIALIZE SIDEBAND W/ 1 FRAME DELAY ...
        C        AND MAINBAND W/ 2 FRAMES DELAY
        C
0028    D        INSTR=0
0029             STATUS=VMOV1(AQPB)
0030    D        IF(STATUS.NE.0)GOTO 10
        C
        C        CALCULATE DC & VAR THEN NORMALIZE & COMPRESS
        C
0031    D        INSTR=1
0032             STATUS=MPFDVM(MAPX,NINM,X2)
0033    D        IF(STATUS.NE.0)GO TO 10
        C
        C        RESULTS
        C
0034    D        CALL MPRDB(NINM,NIN(1),BYTE2,CNVYES,NIN(NTOTI))
0035    D        WRITE(6,898)(I,NIN(I),I=1,NTOTI)
0036    D898     FORMAT(/1X,4(1X,'NIN(',I3,')=',I6,2X))
0037    D        CALL MPRST(52,DCBIAS,1,CNVYES)
0038    D        WRITE(6,900)DCBIAS
0039    D900     FORMAT(/1X,'DCBIAS=',F12.5)
0040    D        CALL MPRST(55,VAR,1,CNVYES)
0041    D        WRITE(6,901)VAR
0042    D901     FORMAT(/1X,'VAR=',F12.5)
0043    D        CALL MPRDB(X2,XR(1),BYTE4,CNVYES,XR(LTH))
0044    D        WRITE(6,920)(I,XR(I),I=1,LTH)
0045    D920     FORMAT(/1X,4(1X,'XR(',I3,')=',E15.8,2X))
0046    D        CALL MPRDB(COSZ,XR(1),BYTE4,CNVYES,XR(LTH))
0047    D        WRITE(6,922)(I,XR(I),I=1,LTH)
0048    D922     FORMAT(/1X,4(1X,'COS(',I3,')=',E15.8,2X))
0049    D        CALL MPRDB(AQPB,NOUT(1),BYTE2,CNVYES,NOUT(LPARM))
0050    D        WRITE(6,899)(I,NOUT(I),I=1,LPARM)
0051    D899     FORMAT(/1X,4(1X,'AQPB(',I3,')=',I6,2X))
0052    D        CALL MPRDB(AQTDCT,QTDCT(1),BYTE2,CNVYES,QTDCT(LTH))
0053    D        WRITE(6,910)(I,QTDCT(I),I=1,LTH)
0054    D910     FORMAT(/1X,4(1X,'AQTDCT(',I3,')=',I6,2X))
0055    D        CALL MPRDB(AIBIT,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0056    D        WRITE(6,911)(I,IBIT(I),I=1,LTH)
0057    D911     FORMAT(/1X,4(1X,'AIBIT(',I3,')=',I6,2X))
0058    D        CALL MPRDB(MIBIT4,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0059    D        WRITE(6,902)(I,IBIT(I),I=1,LTH)
0060    D902     FORMAT(/1X,4(1X,'MIBIT4(',I3,')=',I6,2X))
0061             RETURN
        C
        C        DIAGNOSTIC TRAP AREA
        C
0062    10       TYPE 101,INSTR,STATUS
0063             CALL EXIT
0064    101      FORMAT(1X,'***MAP ERROR*** "DCVAR" INSTR=',I4,' HAS STATUS=',I6/)
0065             END
```

PROGRAM SECTIONS

NAME   SIZE   ATTRIBUTES

```
$CODE1  001334   366            RW,I,CON,LCL
$PDATA  000014     6            RW,D,CON,LCL
$IDATA  000576   191            RW,D,CON,LCL
$VARS   000054    22            RW,D,CON,LCL
MTAPE0  002260   600            RW,D,OVR,GBL
MTAPE1  000012     5            RW,D,OVR,GBL
MTAPE2  000012     5            RW,D,OVR,GBL
OVRI    002020   520            RW,D,OVR,GBL
OVRD    002006   515            RW,D,OVR,GBL
OVRF    006016  1543            RW,D,OVR,GBL
OVRA    000152    53            RW,D,OVR,GBL
OVRP    002022   521            RW,D,OVR,GBL
OVRB    005004  1282            RW,D,OVR,GBL
OVR2    001002   257            RW,D,OVR,GBL
OVRL    000016     7            RW,D,OVR,GBL
OVRD    000012     5            RW,D,OVR,GBL
OVROT   001032   269            RW,D,OVR,GBL
MAPDEF  000200    64            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 030256  6231

DCVAR,LP/LI:1=DCVAR/DE/NOTR
```

```
        C       PROGRAM NAME:DCTF.FTN   ORIGINATED:05-FEB-79
        C                                           UPDATE:09-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE DCTF
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,V0,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRF/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       DCT FORWARD N REAL--->N/2 COMPLEX
```

```
         C       APPLY POST WEIGHTING W/ HALF SAMPLE DELAY
         C
0026     D       INSTR=1
0027             STATUS=FFTN(X2,1,X2,VSHRT,WORK)
0028     D       IF(STATUS.NE.0)GO TO 10
0029     D       INSTR=2
0030             STATUS=MPDCTM(DCTM,X1,X2,COSZ)
0031     D       IF(STATUS.NE.0)GO TO 10
0032     D       INSTR=3
0033             STATUS=FFTIN(X1,1,X1,VLONG,WORK)
0034     D       IF(STATUS.NE.0)GO TO 10
         C
         C       RESULTS
         C
0035     D       CALL MPRDB(DCTM,DCT(1),BYTE4,CNVYES,DCT(LTH))
0036     D       WRITE(6,902)(I,DCT(I),I=1,LTH)
0037     D902    FORMAT(/1X,4(1X,'DCT(',I3,')=',E15.8,2X))
0038             RETURN
         C
         C       DIAGNOSTIC TRAP AREA
         C
0039     10      TYPE 100,INSTR,STATUS
0040             CALL EXIT
0041     100     FORMAT(1X,'***MAP ERROR*** "DCTF" INSTR=',I3,' HAS STATUS=',I6/)
0042             END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000320	104	RW,I,CON,LCL
SPDATA	000004	2	RW,D,CON,LCL
SIDATA	000176	63	RW,D,CON,LCL
SVARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025600 5568

DCTF.LP/LI:1=DCTF/DE/NOTR

```
      ...FILEC.FTN ORIGINATED:05-FEB-79
                         UPDATE:09-MAY-80


      ...INE PITLPC
      ... BUS1,BUS2,BUS3
      ... REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
      ...4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
      ... WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
      ...M2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
      ...TM,YNM,ORPRM,ORDCTM
      ...G,COSZ,VSHRT,YOM,XOM,MAPX
      ...MIBIT,DCTM,OPRM,OTDCTM
      ...NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
      ...RECV1,RECV2,SEN1,SEN2
      ...AOPB,AOTDCT,AIBIT,SEN,INPB
      ...SYNB1,SYNB2,BF1,BF2,OUTB
      ...RECV,AROPB,ARODCT,RIBIT
      1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
      <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
      INTEGER ORDR,START,SIZE,DSW,BTLTH
      LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
      COMMON/MTAPE0/NIN(300),NOUT(300)
      COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
      COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
      COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
      COMMON/OVRO/Y(256),NP,XN
      COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
      COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
      COMMON/OVRP/M,G,VU,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
      COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
      COMMON/OVR2/IORDR(256),LTHM1
      COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
      COMMON/OVRF/XR(512)
      COMMON/OVRD/CSN,START,SIZE,YES,NO
      COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
      1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
      2,DRDCTM,YNM,ORPRM,ORDCTM
      3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
      4,MIBIT,DCTM,OPRM,OTDCTM
      5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
      6,RECV1,RECV2,SEN1,SEN2
      7,AOPB,AOTDCT,AIBIT,SEN,INPB
      8,SYNB1,SYNB2,BF1,BF2,OUTB
      9,RECV,AROPB,ARODCT,RIBIT
      1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
C     >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
      DATA REAL,CMPLX,INTGR/0,1,2/
      DATA EVERY,SINGLE,DOUBLE/1,2,3/
      DATA BYTE2,BYTE4,BYTE8/2,4,8/
      DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
      DATA BUS1,BUS2,BUS3/64,128,192/
C
C     GET PITCH & PITCH GAIN
```

```
      C
      D          INSTR=1
                 STATUS=MPMWGX(R1,NINM,KE,A1)
      D          IF(STATUS.NE.0)GO TO 10
      C
      C          RESULTS
      C
      D          CALL MPRDB(R1,R(1),BYTE4,CNVYES,R(LPCN+1))
      D          WRITE(6,903)(I,R(I),I=1,LPCN+1)
      D903       FORMAT(/1X,5(1X,'R(',I2,')=',E15.8,2X))
      D          CALL MPRST(61,G,1,CNVYES)
                 CALL MPRST(62,XM,1,CNVYES)
      D          CALL MPRST(63,VU,1,CNVYES)
                 M=IFIX(XM)
                 IVUV=IFIX(VU)
      D          WRITE(6,904)M,G,IVUV
      D904       FORMAT(/1X,'M=',I6,', G=',E15.8,' AND VUV=',I1)
      D          CALL MPRDB(A1,A(1),BYTE4,CNVYES,A(LPCN))
      D          WRITE(6,906)(I,A(I),I=1,LPCN)
      D906       FORMAT(/1X,4(1X,'A(',I2,')=',E15.8,2X))
                 CALL MPRDB(KE,PARCOR(1),BYTE4,CNVYES,PARCOR(LPCN))
      D          WRITE(6,907)(I,PARCOR(I),I=1,LPCN)
      D907       FORMAT(/1X,4(1X,'K(',I2,')=',E15.8,2X))
                 DO 1 I=2,LPCN
                 IF(PARCOR(I).NE.0.0)GO TO 1
                 WRITE(4,908)ICOUNT,PARCOR(1)
      2          TYPE 908,ICOUNT,PARCOR(1)
      908        FORMAT(//1X,'***WARNING*** BAD PARCORS IN FRAME ',I4
                 1,' W/ K(1)=',E15.8/)
                 RETURN
      1          CONTINUE
                 RETURN
      C
      C          DIAGNOSTIC TRAP AREA
      C
      10         TYPE 100,INSTR,STATUS
                 CALL EXIT
      100        FORMAT(1X,'***MAP ERROR*** "PITLPC" INSTR=',I3,' HAS STATUS=',I6/)
                 END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	001000	256	RW,I,CON,LCL
$PDATA	000020	8	RW,D,CON,LCL
$IDATA	000446	147	RW,D,CON,LCL
$VARS	000062	25	RW,D,CON,LCL
$TEMPS	000004	2	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL

```
OVRA     000152    53        RW,D,OVR,GBL
OVRP     002027   521        RW,D,OVR,GBL
OVRB     005004  1282        RW,D,OVR,GBL
OVR2     001002   257        RW,D,OVR,GBL
OVRL     000016     7        RW,D,OVR,GBL
OVRD     000012     5        RW,D,OVR,GBL
$APDFF   000200    64        RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026556  5815

PITLPC,LP/LI:1=PITLPC/DE/NOTR
```

```
        C       PROGRAM NAME:QDPARM.FTN ORIGINATED:10-SEP-79
        C                                       UPDATE:12-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE QDPARM
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            INTEGER QTDCT,QTPAR,QTDC,QTVAR,QTM,QTG,QTV
0007            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008            COMMON/MTAPE0/NIN(300),NOUT(300)
0009            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0010            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IRFC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/OVRQT/QTDCT(256),QTPAR(8),QTDC,QTVAR,QTM,QTG,QTV
0022            COMMON/OVRDT/DTDCT(256),DTPAR(8),DTDC,DTVAR,DTM,DTG,DTV,DTA(8)
0023            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0024            DATA REAL,CMPLX,INTGR/0,1,2/
0025            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0026            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0027            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
```

```
0028                DATA BUS1,BUS2,BUS3/64,128,192/
          C
          C         QUANTIZE PARCOR(J),J=1,...,LPCN,DCBIAS,VAR,G,M
          C         DEQUANTIZE PARCOR(J),J=1,...,LPCN,G,M
          C
0029      D         INSTR=1
0030                STATUS=MPODPP(OPRM,PARC,A1)
0031      D         IF(STATUS.NE.0)GO TO 10
          C
          C         RESULTS
          C
0032      D         CALL MPRDB(OPRM,NOUT(1),BYTE2,CNVYES,NOUT(LPARM+1))
0033      D         DO 651 I=1,LPCN
0034      D651      OTPAR(I)=NOUT(I)
0035      D         WRITE(6,924)(J,OTPAR(J),J=1,LPCN)
0036      D924      FORMAT(/1X,4(1X,'OTK(',I2,')=',I6,2X))
0037      D         QTVAR=NOUT(LPCN+1)
0038      D         WRITE(6,926)QTVAR
0039      D926      FORMAT(/1X,'QTVAR=',I6)
0040      D         QTDC=NOUT(LPCN+2)
0041      D         WRITE(6,925)QTDC
0042      D925      FORMAT(/1X,'QTDC=',I6)
0043      D         QTM=NOUT(LPCN+3)
0044      D         QTV=NOUT(LPCN+4)
0045      D         QTG=NOUT(LPCN+5)
0046      D         WRITE(6,927)QTM,QTG,QTV
0047      D927      FORMAT(/1X,'QTM=',I6,', QTG=',I6,' AND QTV=',I6)
0048      D         CALL MPRDB(PARC,DTPAR(1),BYTE4,CNVYES,DTPAR(LPCN))
0049      D         WRITE(6,928)(J,DTPAR(J),J=1,LPCN)
0050      D928      FORMAT(/1X,4(1X,'DTK(',I2,')=',F15.8,2X))
0051      D         CALL MPRST(88,DTDC,1,CNVYES)
0052      D         CALL MPRST(89,DTVAR,1,CNVYES)
0053      D         CALL MPRST(90,DTG,1,CNVYES)
0054      D         CALL MPRST(91,DTM,1,CNVYES)
0055      D         CALL MPRST(104,DTV,1,CNVYES)
0056      D         WRITE(6,929)DTM,DTG,DTV
0057      D929      FORMAT(/1X,'DTM=',E15.8,' DTG=',F15.8,' AND DTV=',E15.8)
0058      D         CALL MPRDB(A1,DTA(1),BYTE4,CNVYES,DTA(LPCN))
0059      D         WRITE(6,931)(J,DTA(J),J=1,LPCN)
0060      D931      FORMAT(/1X,4(1X,'DTA(',I2,')=',E15.8,2X))
0061      D         CALL MPRST(60,ENG,1,CNVYES)
0062      D         WRITE(6,932)ENG
0063      D932      FORMAT(/1X,'ENG=',F15.8)
0064                RETURN
          C
          C         DIAGNOSTIC TRAP AREA
          C
0065      10        TYPE 100,INSTR,STATUS
0066                CALL EXIT
0067      100       FORMAT(1X,'***MAP ERROR*** "QDPARM" INSTR=',I3,' HAS STATUS=',I6/)
0068                END
```

PROGRAM SECTIONS

NAME   SIZE   ATTRIBUTES

```
$CODE1   001102   289        RW,I,CON,LCL
$PDATA   000034    14        RW,D,CON,LCL
$IDATA   000530   172        RW,D,CON,LCL
$VARS    000056    23        RW,D,CON,LCL
*TAPE0   002260   600        RW,D,OVR,GBL
*TAPE1   000012     5        RW,D,OVR,GBL
*TAPE2   000012     5        RW,D,OVR,GBL
OVRI     002020   520        RW,D,OVR,GBL
OVRD     002006   515        RW,D,OVR,GBL
OVRF     006016  1543        RW,D,OVR,GBL
OVRA     000152    53        RW,D,OVR,GBL
OVRP     002022   521        RW,D,OVR,GBL
OVRB     005004  1282        RW,D,OVR,GBL
OVR2     001002   257        RW,D,OVR,GBL
OVRL     000016     7        RW,D,OVR,GBL
OVRD     000012     5        RW,D,OVR,GBL
OVRQT    001032   269        RW,D,OVR,GBL
OVRDT    002124   554        RW,D,OVR,GBL
*APDFF   000200    64        RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 032124  6698

NO FPP INSTRUCTIONS GENERATED

ODPARM,LP/LI:1=ODPARM/DE/NOTR
```

```
        C       PROGRAM NAME:VPRS.FTN   ORIGINATED:05-FEB-79
        C                                       UPDATE:09-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE VPRS
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRF/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       FORM VOCAL TRACT VPRS SPECTRUM
```

```
          C
0026      D        INSTR=1
0027               STATUS=MPFSTV(A1)
0028      D        IF(STATUS.NE.0)GO TO 10
0029      D        INSTR=2
0030               STATUS=FF2R(X1,4,X1,VLONG,WORK)
0031      D        IF(STATUS.NE.0)GO TO 10
          C
          C        RESULTS
          C
0032      D        CALL MPRST(73,EGR,1,CNVYES)
0033      D        WRITE(6,906)K,EGR
0034      D906     FORMAT(/1X,'K=',I3,' AND EGR=',E15.8)
0035               RETURN
          C
          C        DIAGNOSTIC TRAP AREA
          C
0036      10       TYPE 100,INSTR,STATUS
0037               CALL EXIT
0038      100      FORMAT(1X,'***MAP ERROR*** "VPBS" INSTR=',I3,' HAS STATUS=',I6/)
0039               END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000206	67	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000150	52	RW,D,CON,LCL
$VARS	000060	24	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDFF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025454 5526

VPBS,LP/LI:1=VPBS/DE/NOTR

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FORTRAN IV-PLUS V02-51F          13:30:26    09-AUG-80          PAGE 1
BASIS.FTN          /DE/WR

      C        PROGRAM NAME:BASIS.FTN  ORIGINATED:05-FEB-79
      C                                        UPDATE:09-MAY-80
      C
      C
      C
      C
0001           SUBROUTINE BASIS
0002           INTEGER BUS1,BUS2,BUS3
0003           INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
               1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004           INTEGER WORK,X1,X1R,X1I,IORDRM,PWFITM,DCTM1
               1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
               2,DRDCTM,YNM,QRPRM,QRDCTM
               3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
               4,MIBIT,DCTM,QPRM,QTDCTM
               5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
               6,RECV1,RECV2,SEN1,SEN2
               7,AQPB,AQTDCT,AIBIT,SEN,INPB
               8,SYNB1,SYNB2,BF1,BF2,OUTB
               9,RECV,ARQPB,ARQDCT,RIBIT
               1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005           INTEGER ORDR,START,SIZE,DSW,BTLTH
0006           LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007           COMMON/MTAPE0/NIN(300),NOUT(300)
0008           COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009           COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010           COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011           COMMON/OVRO/Y(256),NP,XN
0012           COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013           COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014           COMMON/OVRP/M,G,VU,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015           COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016           COMMON/OVR2/IORDR(256),LTHM1
0017           COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018           COMMON/OVRF/XR(512)
0019           COMMON/OVRD/CSN,START,SIZE,YES,NO
0020           COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWFITM,DCTM1
               1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
               2,DRDCTM,YNM,QRPRM,QRDCTM
               3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
               4,MIBIT,DCTM,QPRM,QTDCTM
               5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
               6,RECV1,RECV2,SEN1,SEN2
               7,AQPB,AQTDCT,AIBIT,SEN,INPB
               8,SYNB1,SYNB2,BF1,BF2,OUTB
               9,RECV,ARQPB,ARQDCT,RIBIT
               1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021           DATA REAL,CMPLX,INTGR/0,1,2/
0022           DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023           DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024           DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025           DATA BUS1,BUS2,BUS3/64,128,192/
      C
      C        GENERATE BASIS FROM VOCAL TRACT & PITCH SPECTRA
```

```
              C
0026          D          INSTR=1
0027                     STATUS=MPBASP(DCTM1,PWEITM,TMP2,X1)
0028          D          IF(STATUS.NE.0)GO TO 10
              C
              C          RESULTS
              C
0029          D          CALL MPRDB(DCTM1,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0030          D          WRITE(6,908)(I,DCT1(I),I=1,LTH)
0031          D908       FORMAT(/1X,4(1X,'DCT1(',I3,')=',E15.8,2X))
0032          D          CALL MPRDB(TMP2,DCT2(1),BYTE4,CNVYES,DCT2(LTH))
0033          D          WRITE(6,909)(I,DCT2(I),I=1,LTH)
0034          D909       FORMAT(/1X,4(1X,'DCT2(',I3,')=',E15.8,2X))
0035                     RETURN
              C
              C          DIAGNOSTIC TRAP AREA
              C
0036          10         TYPE 100,INSTR,STATUS
0037                     CALL EXIT
0038          100        FORMAT(1X,'***MAP ERROR*** "BASIS" INSTR=',I3,' HAS STATUS=',I6/)
0039                     END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000350	116	RW,I,CON,LCL
$IDATA	000216	71	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025644   5586

NO FPP INSTRUCTIONS GENERATED

BASIS,LP/LI:1=BASIS/DE/NOTR

```
      C       PROGRAM NAME:ASRT.FTN   ORIGINATED:10-SEP-79
      C                                    UPDATE:09-MAY-80
      C
      C
      C
      C
0001          SUBROUTINE ASRT
0002          INTEGER BUS1,BUS2,BUS3
0003          INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
              1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004          INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,ORPRM,ORDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,OPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AOPB,AOTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,AROPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005          INTEGER ORDR,START,SIZE,DSW,BTLTH
0006          LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007          COMMON/MTAPE0/NIN(300),NOUT(300)
0008          COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0009          COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010          COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011          COMMON/OVRO/Y(256),NP,XN
0012          COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013          COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014          COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015          COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016          COMMON/OVR2/IORDR(256),LTHM1
0017          COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018          COMMON/OVRE/XR(512)
0019          COMMON/OVRD/CSN,START,SIZE,YES,NO
0020          COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,ORDCTM,YNM,ORPRM,ORDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,OPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AOPB,AOTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,AROPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021          DATA REAL,CMPLX,INTGR/0,1,2/
0022          DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023          DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024          DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025          DATA BUS1,BUS2,BUS3/64,128,192/
      C
      C       ORDER DCT1(.) MAX-TO-MIN W/ ORDERING INFO IN IORDR(.)
```

```
            C        SORT TMP2 TO DCTM2
            C        SORT DCTM TO TMP3
            C        SORT DCTM1 TO TMP4
            C
0026        D        INSTR=1
0027                 STATUS=MPASRT(IORDRM)
0028        D        IF(STATUS.NE.0)GO TO 10
            C
            C        RESULTS
            C
0029        D        CALL MPRDB(DCTM2,DCT2(1),BYTE4,CNVYES,DCT2(LTH))
0030        D        CALL MPRDB(IORDRM,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
0031        D        WRITE(6,910)(I,IORDR(I),I=1,LTH)
0032        D910     FORMAT(/1X,6(1X,'IORDR(',I3,')=',I3,2X))
0033        D        WRITE(6,909)(I,DCT2(I),I=1,LTH)
0034        D909     FORMAT(/1X,4(1X,'DCT2(',I3,')=',E15.8,2X))
0035        D        CALL MPRDB(TMP4,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0036        D        WRITE(6,911)(I,DCT1(I),I=1,LTH)
0037        D911     FORMAT(/1X,4(1X,'DCT1T(',I3,')=',E15.8,2X))
0038        D        CALL MPRDB(TMP3,DCT(1),BYTE4,CNVYES,DCT(LTH))
0039        D        WRITE(6,912)(I,DCT(I),I=1,LTH)
0040        D912     FORMAT(/1X,4(1X,'DCTT(',I3,')=',E15.8,2X))
0041                 RETURN
            C
            C        DIAGNOSTIC TRAP AREA
            C
0042        10       TYPE 100,INSTR,STATUS
0043                 CALL EXIT
0044        100      FORMAT(1X,'***MAP ERROR*** "ASRT" INSTR=',I3,' HAS STATUS=',I6/)
0045                 END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000620	200	RW,I,CON,LCL
$IDATA	000324	106	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVR1	002020	520	RW,D,OVR,GBL
OVRD	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026222 5705

```
NO FPP INSTRUCTIONS GENERATED

ASRT.LP/LI:1=ASRT/DE/NOTR
```

```
        C        PROGRAM NAME:SDCT.FTN    ORIGINATED:05-FEB-79
        C                                          UPDATE:24-MAY-80
        C
        C
        C
        C
0001             SUBROUTINE SDCT
0002             INTEGER BUS1,BUS2,BUS3
0003             INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                 1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004             INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,ORPRM,ORDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,OPRM,OTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,OUTB
                 9,RECV,AROPB,ARODCT,RIBIT
                 1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005             INTEGER ORDR,START,SIZE,DSW,BTLTH
0006             LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007             COMMON/MTAPE0/NIN(300),NOUT(300)
0008             COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009             COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010             COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011             COMMON/OVRO/Y(256),NP,XN
0012             COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013             COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014             COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015             COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016             COMMON/OVR2/IORDR(256),LTHM1
0017             COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018             COMMON/OVRF/XR(512)
0019             COMMON/OVRD/CSN,START,SIZE,YES,NO
0020             COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,ORPRM,ORDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,OPRM,OTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,OUTB
                 9,RECV,AROPB,ARODCT,RIBIT
                 1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021             DATA TMP3,TMP4/46,47/
0022             DATA REAL,CMPLX,INTGR/0,1,2/
0023             DATA EVERY,SINGLE,DOUBLE/1,2,3/
0024             DATA BYTE2,BYTE4,BYTE8/2,4,8/
0025             DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0026             DATA BUS1,BUS2,BUS3/64,128,192/
        C
```

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

UNCLASSIFIED NL

9 OF 9

AD A091663

END
DATE FILMED
12-80
DTIC

```
        C         SCAN DCT LIST FOR ALL SIGNIFICANT POINTS
        C         PRELIMINARY BIT ASSIGNMENT TO TMP1
        C
0027    D         INSTR=1
0028              STATUS=MPSCAN(DCTM2)
0029    D         IF(STATUS.NE.0)GO TO 10
        C
        C         RESULTS
        C
0030    D         CALL MPRST(R0,CTEMP,1,CNVYES)
0031    D         CALL MPRST(R2,BITSMN,1,CNVYES)
0032    D         CALL MPRST(R3,XITOT,1,CNVYES)
0033    D         ITOT=IFIX(XITOT)
0034    D         WRITE(6,930)BITSMN,CTEMP,ITOT
0035    D930      FORMAT(/1X,'BITS= ',F15.8,' W/ CTEMP=',F15.8,' @ ITOT= ',I3)
0036    D         CALL MPRDB(TMP1,XR(1),BYTE4,CNVYES,XR(LTH))
0037    D         WRITE(6,911)(I,IFIX(XR(I)),I=1,LTH)
0038    D911      FORMAT(/1X,6(1X,'IBIT(',I3,')=',I3,2X))
0039              RETURN
        C
        C         DIAGNOSTIC TRAP AREA
        C
0040    10        TYPE 100,INSTR,STATUS
0041              CALL EXIT
0042    100       FORMAT(1X,'***MAP ERROR*** "SDCT" INSTR=',I3,' HAS STATUS=',I6/)
0043              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000344	114	RW,I,CON,LCL
$PDATA	000020	8	RW,D,CON,LCL
$IDATA	000250	84	RW,D,CON,LCL
$VARS	000064	26	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025722   5609

SDCT,LP/LI:1=SDCT/DE/NOTR

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FORTRAN IV-PLUS V02-51E          13:30:46     09-AUG-80             PAGE 1
BITA.FTN          /DE/WR

        C       PROGRAM NAME:BITA.FTN   ORIGINATED:05-FEB-79
        C                                       UPDATE:23-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE BITA
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/SECTIO/MODUL
0008            COMMON/MTAPE0/NIN(300),NOUT(300)
0009            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0010            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0022            DATA TMP3,TMP4/46,47/
0023            DATA REAL,CMPLX,INTGR/0,1,2/
0024            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0025            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0026            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0027            DATA BUS1,BUS2,BUS3/64,128,192/
```

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FORTRAN IV-PLUS V02-51E          13:30:46     09-AUG-80            PAGE 2
BITA.FTN            /DE/WR

          C
          C         ASSIGN BITS TO DCT ELEMENTS
          C
          C         ANALYSIS:MODUL=1,SYNTHESIS:MODUL=2
0028      D         INSTR=1
0029                IF(MODUL.EQ.1)STATUS=MPCDBA(MIBIT3)
0030                IF(MODUL.EQ.2)STATUS=MPCDBA(MIBIT1)
0031      D         IF(STATUS.NE.0)GO TO 10
          C
          C         RESULTS
          C
0032      D         IF(MODUL.EQ.1)CALL MPRDB(MIBIT3,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0033      D         IF(MODUL.EQ.2)CALL MPRDB(MIBIT1,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0034      D         IF(STATUS.NE.0)GO TO 10
0035      D         WRITE(6,911)(I,IBIT(I),I=1,LTH)
0036      D911      FORMAT(/1X,6(1X,'IBIT(',I3,')=',I3,2X))
0037                RETURN
          C
          C         DIAGNOSTIC TRAP AREA
          C
0038      10        TYPE 100,INSTR,STATUS
0039                CALL EXIT
0040      100       FORMAT(1X,'***MAP ERROR*** "BITA" INSTR=',I3,' HAS STATUS=',I6/)
0041                END

PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

SCODE1   000334   110           RW,I,CON,LCL
SIDATA   000160    56           RW,D,CON,LCL
SVARS    000054    22           RW,D,CON,LCL
SECTIO   000002     1           RW,D,OVR,GBL
MTAPE0   002260   600           RW,D,OVR,GBL
MTAPE1   000012     5           RW,D,OVR,GBL
MTAPE2   000012     5           RW,D,OVR,GBL
OVRI     002020   520           RW,D,OVR,GBL
OVRO     002006   515           RW,D,OVR,GBL
OVRF     006016  1543           RW,D,OVR,GBL
OVRA     000152    53           RW,D,OVR,GBL
OVRP     002022   521           RW,D,OVR,GBL
OVRR     005004  1282           RW,D,OVR,GBL
OVR2     001002   257           RW,D,OVR,GBL
OVRL     000016     7           RW,D,OVR,GBL
OVRD     000012     5           RW,D,OVR,GBL
MAPDEF   000200    64           RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025574  5566

NO FPP INSTRUCTIONS GENERATED

BITA,LP/LI:1=BITA/DE/NOTR
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```
        C       PROGRAM NAME:QDCT.FTN    ORIGINATED:10-SEP-79
        C                                       UPDATE:23-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE QDCT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            INTEGER QTDCT,QTPAR,QTDC,QTVAR,QTM,QTG,QTV
0007            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008            COMMON/MTAPE0/NIN(300),NOUT(300)
0009            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0010            COMMON/MTAPE2/NFND,NERR,NFILE,NINS,NOUTS
0011            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/OVRQT/QTDCT(256),QTPAR(8),QTDC,QTVAR,QTM,QTG,QTV
0022            COMMON/OVRDT/DTDCT(256),DTPAR(8),DTDC,DTVAR,DTM,DTG,DTV,DTA(8)
0023            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0024            DATA REAL,CMPLX,INTGR/0,1,2/
0025            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0026            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0027            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
```

```
0028                DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C           QUANTIZE DCT(.) W/ IBIT(.) ACCORDING TO IORDR(.)
        C
0029    D           INSTR=1
0030                STATUS=MPESTQ(QTDCTM,MIBIT3,TMP1,TMP2)
0031    D           IF(STATUS.NE.0)GO TO 10
        C
        C           RESULTS
        C
0032    D           DO 21 I=1,LTH
0033    D21         IORDR(I)=IORDR(I)+1
0034    D           CALL MPRDB(QTDCTM,NOUT(1),BYTE2,CNVYES,NOUT(LTH))
0035    D           DO 22 I=1,LTH
0036    D           J=IORDR(I)
0037    D           QTDCT(J)=NOUT(I)
0038    D22         NOUT(I)=0
0039    D           WRITE(6,912)(I,QTDCT(I),I=1,LTH)
0040    D912        FORMAT(/1X,4(1X,'QTDCT(',I3,')=',I3,2X))
0041    D           CALL MPRDB(MIBIT3,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0042    D           WRITE(6,913)(I,IBIT(I),I=1,LTH)
0043    D913        FORMAT(/1X,4(1X,'MIBIT3(',I3,')=',I3,2X))
0044                RETURN
        C
        C           DIAGNOSTIC TRAP AREA
        C
0045    10          TYPE 100,INSTR,STATUS
0046                CALL EXIT
0047    100         FORMAT(1X,'***MAP ERROR*** "QDCT" INSTR=',I3,' HAS STATUS=',I6/)
0048                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000446	147	RW,I,CON,LCL
$IDATA	000216	71	RW,D,CON,LCL
$VARS	000056	23	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
OVROT	001032	269	RW,D,OVR,GBL
OVRDT	002124	554	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

```
TOTAL SPACE ALLOCATED = 031122  6441

NO FPP INSTRUCTIONS GENERATED

ODCT,LP/LI:1=ODCT/DE/NOTR
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```
        C       PROGRAM NAME:CHANL.FTN  ORIGINATED:10-SEP-79
        C                                       UPDATE:13-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE CHANL
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/CHANEL/IAOPB(14),IAODCT(256)
0011            COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,V0,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0022            DATA REAL,CMPLX,INTGR/0,1,2/
0023            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0024            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0025            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0026            DATA BUS1,BUS2,BUS3/64,128,192/
        C
```

```
0027    D          WRITE(6,699)ICOUNT
0028    D699       FORMAT(1H1,40(1H>),'RECEIVE FRAME # ',I4,40(1H<))
        C
        C          PASS DATA W/ NO ERRORS
        C
0029    D          INSTR=1
0030               STATUS=MPWDB(AROOCT,IAODCT(1),BYTE2,CNVYES,IAODCT(LTH))
0031    D          IF(STATUS.NE.0)GO TO 10
0032    D          INSTR=2
0033               STATUS=MPWDB(AROPB,IAOPB(1),BYTE2,CNVYES,IAOPB(LPARM+1))
0034    D          IF(STATUS.NE.0)GO TO 10
0035    D          WRITE(6,899)
0036    D899       FORMAT(/1X,'*** MODEM OUTPUT ***')
0037    D          WRITE(6,900)(IAOPB(I),I=1,LPARM)
0038    D900       FORMAT(/1X,6(1X,'AROPB(',I2,')=',I6,2X))
0039    D          WRITE(6,901)(IAODCT(I),I=1,LTH)
0040    D901       FORMAT(/1X,6(1X,'AROOCT(',I3,')=',I6,2X))
        C
        C          ADD TRANSMISSION DELAY
        C
0041    D          INSTR=3
0042               STATUS=MPRDB(AOTDCT,IAODCT(1),BYTE2,CNVYES,IAODCT(LTH))
0043    D          IF(STATUS.NE.0)GO TO 10
0044    D          INSTR=4
0045               STATUS=MPRDB(AOPB,IAOPB(1),BYTE2,CNVYES,IAOPB(LPARM+1))
0046    D          IF(STATUS.NE.0)GO TO 10
0047    D          WRITE(6,799)
0048    D799       FORMAT(/1X,'*** MODEM INPUT ***')
0049    D          WRITE(6,800)(IAOPB(I),I=1,LPARM)
0050    D800       FORMAT(/1X,6(1X,'AOPB(',I2,')=',I6,2X))
0051    D          WRITE(6,801)(IAODCT(I),I=1,LTH)
0052    D801       FORMAT(/1X,6(1X,'AOTDCT(',I3,')=',I6,2X))
0053               RETURN
        C
        C          DIAGNOSTIC TRAP AREA
        C
0054    10         TYPE 100,INSTR,STATUS
0055               CALL EXIT
0056    100        FORMAT(1X,'***MAP ERROR*** "CHANL" INSTR=',I3,' HAS STATUS=',I6/)
0057               END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000644	210	RW,I,CON,LCL
$IDATA	000452	149	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
CHANFL	001034	270	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL

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OVRA     000152     53              RW,D,OVR,GBL
OVRP     002022    521              RW,D,OVR,GBL
OVRB     005004   1282              RW,D,OVR,GBL
OVR2     001002    257              RW,D,OVR,GBL
OVRL     000016      7              RW,D,OVR,GBL
OVRO     000012      5              RW,D,OVR,GBL
MAPDEF   000200     64              RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 027430  6028

NO FPP INSTRUCTIONS GENERATED

CHANL.LP/LI:1=CHANL/DE/NOTR
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```
        C       PROGRAM NAME:DPARM.FTN  ORIGINATED:10-SEP-79
        C                                          UPDATE:13-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE DPARM
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            INTEGER ORDCT,QRPAR,ORDC,QRVAR,QRM,QRG,QRV
0007            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008            COMMON/MTAPE0/NIN(300),NOUT(300)
0009            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0010            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/OVRDT/DRDCT(256),DRPAR(8),DRDC,DRVAR,DRM,DRG,DRV,DRA(8)
0022            COMMON/OVRQT/ORDCT(256),QRPAR(8),QRDC,QRVAR,QRM,QRG,QRV
0023            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0024            DATA REAL,CMPLX,INTGR/0,1,2/
0025            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0026            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0027            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
```

```
0028                  DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C             SIDEBAND DEQUANTIZATION LAGS SIDEBAND DESERIALIZATION
        C             BY 1 FRAME DUE TO CSPU IN BACKGROUND
        C
0029    D             INSTR=1
0030                  STATUS=VMOV2(QRPRM)
0031    D             IF(STATUS.NE.0)GO TO 10
        C
        C             DEQUANTIZE PARCOR(J),J=1,...,LPCN,G,M,VUV
        C
0032    D             INSTR=2
0033                  STATUS=MPDQPP(PARC,QRPRM,A1)
0034    D             IF(STATUS.NE.0)GO TO 10
        C
        C             RESULTS
        C
0035    D             CALL MPRDH(QRPRM,IBIT(1),BYTE2,CNVYES,IBIT(LPARM+1))
0036    D             WRITE(6,927)(J,IBIT(J),J=1,LPARM)
0037    D927          FORMAT(/1X,4(1X,'QRPRM(',I2,')=',I6,2X))
0038    D             CALL MPRDH(PARC,DRPAR(1),BYTE4,CNVYES,DRPAR(LPCN))
0039    D             WRITE(6,928)(J,DRPAR(J),J=1,LPCN)
0040    D928          FORMAT(/1X,4(1X,'DRK(',I2,')=',E15.8,2X))
0041    D             CALL MPRST(88,DRDC,1,CNVYES)
0042    D             CALL MPRST(89,DRVAR,1,CNVYES)
0043    D             CALL MPRST(90,DRG,1,CNVYES)
0044    D             CALL MPRST(91,DRM,1,CNVYES)
0045    D             CALL MPRST(104,DRV,1,CNVYES)
0046    D             WRITE(6,925)DRDC,DRVAR
0047    D925          FORMAT(1X,'DRDC(88)=',E15.8,' AND DRVAR(89)=',E15.8)
0048    D             WRITE(6,929)DRM,DRG,DRV
0049    D929          FORMAT(/1X,'DRM=',E15.8,', DRG=',E15.8,' AND DRV=',E15.8)
0050    D             CALL MPRDH(A1,DRA(1),BYTE4,CNVYES,DRA(LPCN))
0051    D             WRITE(6,931)(J,DRA(J),J=1,LPCN)
0052    D931          FORMAT(/1X,4(1X,'DRA(',I2,')=',E15.8,2X))
0053    D             CALL MPRST(60,ENG,1,CNVYES)
0054    D             WRITE(6,932)ENG
0055    D932          FORMAT(/1X,'ENG=',E15.8)
0056    D             CALL MPRDH(QRDCTM,QRDCT(1),BYTE2,CNVYES,QRDCT(LTH))
0057    D             WRITE(6,940)(I,QRDCT(I),I=1,LTH)
0058    D940          FORMAT(/1X,4(1X,'QRDCTM(',I3,')=',I6,2X))
0059    D             CALL MPRDH(MIBIT2,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0060    D             WRITE(6,941)(I,IBIT(I),I=1,LTH)
0061    D941          FORMAT(/1X,4(1X,'MIBIT2(',I3,')=',I6,2X))
0062    D             CALL MPRDH(IORDR2,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
0063    D             WRITE(6,942)(I,IORDR(I),I=1,LTH)
0064    D942          FORMAT(/1X,4(1X,'IORDR2(',I3,')=',I6,2X))
0065    D             CALL MPRDH(DCT1T2,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0066    D             WRITE(6,943)(I,DCT1(I),I=1,LTH)
0067    D943          FORMAT(/1X,4(1X,'DCT1(',I3,')=',E15.8,2X))
0068    D             CALL MPRST(100,DRDC,1,CNVYES)
0069    D             CALL MPRST(101,DRVAR,1,CNVYES)
0070    D             WRITE(6,944)DRDC,DRVAR
0071    D944          FORMAT(1X,'DRDC(100)=',E15.8,' AND VAR(101)=',E15.8)
0072                  RETURN
        C
```

```
             C       DIAGNOSTIC TRAP AREA
             C
0073     10          TYPE 100,INSTR,STATUS
0074                 CALL EXIT
0075     100         FORMAT(1X,'***MAP ERROR*** "DPARM" INSTR=',I4,' HAS STATUS=',I6/)
0076                 END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	001542	433	RW,I,CON,LCL
$PDATA	000044	18	RW,D,CON,LCL
$IDATA	001036	271	RW,D,CON,LCL
$VARS	000056	23	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRD	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
OVRDT	002124	554	RW,D,OVR,GBL
OVRQT	001032	269	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 033102 6945

DPARM,LP/LI:1=DPARM/DE/NOTR

```
        C       PROGRAM NAME:SSRT.FTN   ORIGINATED:10-SEP-79
        C                                    UPDATE:07-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE SSRT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,ORDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRF/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,ORDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       ORDER DCT1(.) MAX-TO-MIN W/ ORDERING INFO IN IORDR(.)
```

```
        C       SORT TMP2 TO DCTM2
        C       SORT DCTM1 TO TMP4
        C
0026    D       INSTR=1
0027            STATUS=MPSSRT(IORDRM)
0028    D       IF(STATUS.NE.0)GO TO 10
        C
        C       RESULTS
        C
0029    D       CALL MPRDB(DCTM2,DCT2(1),BYTE4,CNVYES,DCT2(LTH))
0030    D       CALL MPRDB(IORDRM,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
0031    D       WRITE(6,910)(I,IORDR(I),I=1,LTH)
0032    D910    FORMAT(/1X,6(1X,'IORDR(',I3,')=',I3,2X))
0033    D       WRITE(6,909)(I,DCT2(I),I=1,LTH)
0034    D909    FORMAT(/1X,4(1X,'DCT2(',I3,')=',E15.8,2X))
0035    D       CALL MPRDB(TMP4,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0036    D       WRITE(6,911)(I,DCT1(I),I=1,LTH)
0037    D911    FORMAT(/1X,4(1X,'DCT1T(',I3,')=',E15.8,2X))
0038            RETURN
        C
        C       DIAGNOSTIC TRAP AREA
        C
0039    10      TYPE 100,INSTR,STATUS
0040            CALL EXIT
0041    100     FORMAT(1X,'***MAP ERROR*** "SSRT" INSTR=',I3,' HAS STATUS=',I6/)
0042            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000470	156	RW,I,CON,LCL
$IDATA	000256	87	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRD	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVPL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026024 5642

NO FPP INSTRUCTIONS GENERATED

SSRT,LP/LI:1=SSRT/DE/NOTR

```
          C        PROGRAM NAME:DDCT.FTN    ORIGINATED:05-FEB-79
          C                                       UPDATE:13-MAY-80
          C
          C
          C
          C
0001               SUBROUTINE DDCT
0002               INTEGER BUS1,BUS2,BUS3
0003               INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                   1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004               INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,DRDCTM,YNM,QRPRM,QRDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,QPRM,QTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AQPB,AQTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,ARQPB,ARQDCT,RIBIT
                   1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
          C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005               INTEGER ORDR,START,SIZE,DSW,BTLTH
0006               LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007               COMMON/MTAPE0/NIN(300),NOUT(300)
0008               COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009               COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010               COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011               COMMON/OVRO/Y(256),NP,XN
0012               COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013               COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014               COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015               COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016               COMMON/OVR2/IORDR(256),LTHM1
0017               COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018               COMMON/OVRF/XR(512)
0019               COMMON/OVRD/CSN,START,SIZE,YES,NO
0020               COMMON/OVRDT/DTDCT(256),DTPAR(8),DTDC,DTVAR,DTM,DTG,DTV,DTA(8)
0021               COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,DRDCTM,YNM,QRPRM,QRDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,QPRM,QTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AQPB,AQTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,ARQPB,ARQDCT,RIBIT
                   1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
          C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0022               DATA REAL,CMPLX,INTGR/0,1,2/
0023               DATA EVERY,SINGLE,DOUBLE/1,2,3/
0024               DATA BYTE2,BYTE4,BYTE8/2,4,8/
0025               DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0026               DATA BUS1,BUS2,BUS3/64,128,192/
          C
```

```
          C         DEQUANTIZATION OF MAINBAND LAGS MAINBAND DESERIALIZATION
          C         BY 1 FRAME DUE TO CSPU IN THE BACKGROUND
          C
0027      D         INSTR=1
          C         GIVE CSPU BIT ASSIGNMENT FOR UNPACKING OF MAINBAND
0028                STATUS=VMOV3(RIBIT)
0029      D         IF(STATUS.NE.0)GO TO 10
          C
          C         DEQUANTIZE DCT(I)
          C
0030      D         INSTR=2
0031                STATUS=MPESTD(DRDCTM,QRDCTM,TMP1,IORDR2)
0032      D         IF(STATUS.NE.0)GO TO 10
          C
          C         RESULTS
          C
0033      D         CALL MPRDB(DRDCTM,DTDCT(1),BYTE4,CNVYES,DTDCT(LTH))
0034      D         WRITE(6,934)(I,DTDCT(I),I=1,LTH)
0035      D934      FORMAT(/1X,4(1X,'DRDCTM(',I3,')=',E15.8,2X))
0036      D         CALL MPRDB(RIBIT,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0037      D         WRITE(6,935)(I,IBIT(I),I=1,LTH)
0038      D935      FORMAT(/1X,4(1X,'RIBIT(',I3,')=',I6,2X))
0039      D         CALL MPRDB(DCT1T1,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0040      D         WRITE(6,936)(I,DCT1(I),I=1,LTH)
0041      D936      FORMAT(/1X,4(1X,'DCT1T1(',I3,')=',E15.8,2X))
0042      D         CALL MPRDB(IORDR1,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
0043      D         WRITE(6,937)(I,IORDR(I),I=1,LTH)
0044      D937      FORMAT(/1X,4(1X,'IORDR1(',I3,')=',I6,2X))
0045      D         CALL MPRDB(MIBIT1,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0046      D         WRITE(6,938)(I,IBIT(I),I=1,LTH)
0047      D938      FORMAT(/1X,4(1X,'MIBIT1(',I3,')=',I6,2X))
0048      D         CALL MPRST(102,DRDC,1,CNVYES)
0049      D         CALL MPRST(103,DRVAR,1,CNVYES)
0050      D         WRITE(6,940)DRDC,DRVAR
0051      D940      FORMAT(1X,'DRDC(102)=',E15.8,2X,' AND DRVAR(103)=',E15.8)
0052                RETURN
          C
          C         DIAGNOSTIC TRAP AREA
          C
0053      10        TYPE 100,INSTR,STATUS
0054                CALL EXIT
0055      100       FORMAT(1X,'***MAP ERROR*** "DDCT" INSTR=',I4,' HAS STATUS=',I6/)
0056                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	001056	279	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000506	163	RW,D,CON,LCL
$VARS	000064	26	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL

```
OVRI    002020   520        RW,D,OVR,GBL
OVRO    002006   515        RW,D,OVR,GBL
OVRF    006016  1543        RW,D,OVR,GBL
OVRA    000152    53        RW,D,OVR,GBL
OVRP    002022   521        RW,D,OVR,GBL
OVRB    005004  1282        RW,D,OVR,GBL
OVR2    001002   257        RW,D,OVR,GBL
OVRL    000016     7        RW,D,OVR,GBL
OVRD    000012     5        RW,D,OVR,GBL
OVRDT   002124   554        RW,D,OVR,GBL
MAPDEF  000200    64        RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 031012  6405

DDCT,LP/LI:1=DDCT/DE/NOTR
```

```
      C       PROGRAM NAME:DCTR.FTN   ORIGINATED:05-FEB-79
      C                                          UPDATE:12-MAY-80
      C
      C
      C
      C
0001          SUBROUTINE DCTR
0002          INTEGER BUS1,BUS2,BUS3
0003          INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
              1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004          INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,QRPRM,QRDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,QPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AQPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,ARQPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005          INTEGER ORDR,START,SIZE,DSW,BTLTH
0006          LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007          COMMON/MTAPE0/NIN(300),NOUT(300)
0008          COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009          COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010          COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011          COMMON/OVRO/Y(256),NP,XN
0012          COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013          COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014          COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015          COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016          COMMON/OVR2/IORDR(256),LTHM1
0017          COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018          COMMON/OVRF/XR(512)
0019          COMMON/OVRD/CSN,START,SIZE,YES,NO
0020          COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,QRPRM,QRDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,QPRM,QTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AQPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,ARQPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
      C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021          DATA REAL,CMPLX,INTGR/0,1,2/
0022          DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023          DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024          DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025          DATA BUS1,BUS2,BUS3/64,128,192/
      C
      C       FORM INPHASE & QUADRATURE COMPONENTS
```

```
        C
0026    D          INSTR=1
0027               STATUS=MPIDCM(X2,DRDCTM,COSZ)
0028    D          IF(STATUS.NE.0)GO TO 10
0029    D          CALL MPRDB(X2,XR(1),BYTE8,CNVYES,XR(LTH2))
0030    D          WRITE(6,914)(I,XR(I),I=1,LTH2)
0031    D          INSTR=2
0032               STATUS=FFTIN(X2,1,X2,VSHRT,WORK)
0033    D          IF(STATUS.NE.0)GO TO 10
        C
        C          RESULTS
        C
0034    D          CALL MPRDB(X2,XR(1),BYTE4,CNVYES,XR(LTH))
0035    D          WRITE(6,914)(I,XR(+I),I=1,LTH)
0036    D914       FORMAT(/1X,4(1X,'X(',I3,')=',E15.8,2X))
0037               RETURN
        C
        C          DIAGNOSTIC TRAP AREA
        C
0038    10         TYPE 100,INSTR,STATUS
0039               CALL EXIT
0040    100        FORMAT(1X,'***MAP ERROR*** "DCTR" INSTR=',I3,' HAS STATUS=',I6/)
0041               END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000406	131	RW,I,CON,LCL
$PDATA	000004	2	RW,D,CON,LCL
$IDATA	000172	61	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025662 5593

DCTR,LP/LI:1=DCTR/DE/NOTR

```
      C       PROGRAM NAME:VARDC.FTN          ORIGINATED:17-SEP-79
      C                                                   UPDATE:09-MAY-80
      C
      C
      C
      C
0001          SUBROUTINE VARDC
0002          INTEGER BUS1,BUS2,BUS3
0003          INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
              1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004          INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,ORPRM,QRDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,OPRM,OTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AOPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,AROPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
      C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005          INTEGER ORDR,START,SIZE,DSW,BTLTH
0006          LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007          COMMON/MTAPE0/NIN(300),NOUT(300)
0008          COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009          COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010          COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011          COMMON/OVRO/Y(256),NP,XN
0012          COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013          COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014          COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015          COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016          COMMON/OVR2/IORDR(256),LTHM1
0017          COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018          COMMON/OVRF/XR(512)
0019          COMMON/OVRD/CSN,START,SIZE,YES,NO
0020          COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
              1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
              2,DRDCTM,YNM,ORPRM,QRDCTM
              3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
              4,MIBIT,DCTM,OPRM,OTDCTM
              5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
              6,RECV1,RECV2,SEN1,SEN2
              7,AOPB,AQTDCT,AIBIT,SEN,INPB
              8,SYNB1,SYNB2,BF1,BF2,OUTB
              9,RECV,AROPB,ARQDCT,RIBIT
              1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
      C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021          DATA REAL,CMPLX,INTGR/0,1,2/
0022          DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023          DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024          DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025          DATA BUS1,BUS2,BUS3/64,128,192/
      C
0026  D       INSTR=1
```

```
FORTRAN IV-PLUS V02-51E          13:31:39     09-AUG-80            PAGE 2
VARDC.FTN          /DE/WR

0027                STATUS=MPVDNM(NOUTM,YDM,X2)
0028       D        IF(STATUS.NE.0)GO TO 10
           C
           C        RESULTS
           C
0029       D        CALL MPRST(100,DCBIAS,1,CNVYES)
0030       D        WRITE(6,900)DCBIAS
0031       D900     FORMAT(/1X,'DCBIAS=',E15.8)
0032       D        CALL MPRST(101,VAR,1,CNVYES)
0033       D        WRITE(6,901)VAR
0034       D901     FORMAT(/1X,'VAR=',E15.8)
0035                RETURN
           C
           C        DIAGNOSTIC TRAP AREA
           C
0036       10       TYPE 101,INSTR,STATUS
0037                CALL EXIT
0038       101      FORMAT(1X,'***MAP ERROR*** "VARDC" INSTR=',I3,' HAS STATUS=',I6/)
0039                END

PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

$CODE1   000200    64           RW,I,CON,LCL
$PDATA   000014     6           RW,D,CON,LCL
$IDATA   000160    56           RW,D,CON,LCL
$VARS    000052    21           RW,D,CON,LCL
MTAPE0   002260   600           RW,D,OVR,GBL
MTAPE1   000012     5           RW,D,OVR,GBL
MTAPE2   000012     5           RW,D,OVR,GBL
OVRI     002020   520           RW,D,OVR,GBL
OVRO     002006   515           RW,D,OVR,GBL
OVRF     006016  1543           RW,D,OVR,GBL
OVRA     000152    53           RW,D,OVR,GBL
OVRP     002022   521           RW,D,OVR,GBL
OVRB     005004  1282           RW,D,OVR,GBL
OVR2     001002   257           RW,D,OVR,GBL
OVRL     000016     7           RW,D,OVR,GBL
OVRD     000012     5           RW,D,OVR,GBL
MAPDEF   000200    64           RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025450  5524

NO FPP INSTRUCTIONS GENERATED

VARDC,LP/LI:1=VARDC/DE/NOTR
```

```
        C       PROGRAM NAME:OUTPUT.FTN ORIGINATED:05-FEB-79
        C                                            UPDATE:09-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE OUTPUT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSN,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRE/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       TRANSFER TO TAPE OUTPUT VECTOR
```

```
          C
          C        CHECK FOR REQUEST FROM "INPUT"
0026               IF(NEND.NE.0)GO TO 5000
0027      D        INSTR=1
0028               STATUS=MPWT(1,1)
0029               STATUS=MPRDB(NOUTB,NOUT(1),BYTE2,CNVYES,NOUT(NTOTO))
0030               IF(STATUS.NE.0)GO TO 10
          CD       WRITE(6,913)(I,NOUT(I),I=1,NTOTO)
          CD913    FORMAT(/1X,4(1X,'NOUT(',I3,')=',I6,2X))
          C
          C        DATA OUTPUT
          C
0031               CALL TAPE2(2)
0032               RETURN
          C
          C        EOF ON INPUT,WRITE EOF
          C
0033      5000     ICOUNT=ICOUNT-1
0034               DO 5001 I=1,NTUPS
0035      5001     NOUT(I)=0
0036               DO 5002 I=1,32
0037      5002     CALL TAPE2(2)
0038               NSKIP=NSKIPS
0039               NEND=0
0040               IST=1
0041               CALL TAPE2(6)
0042               DO 5005 I=1,ICOUNT
0043               CALL TAPE2(1)
0044               IF(NEND)5077,5076,5077
0045      5076     DO 5006 J=1,NTUPS
0046      5006     NOUT(J)=NIN(J)
0047      5005     CALL TAPE2(2)
0048      5077     DO 5007 I=1,NTUPS
0049      5007     NOUT(I)=0
0050               DO 5008 I=1,8
0051      5008     CALL TAPE2(2)
0052               CALL TAPE2(5)
          C        CALL MPCLS(0)
          C        TYPE 100,ICOUNT
          C100     FORMAT(1X,'"ATC" DONE AFTER ',I6,' FRAMES!'/)
          C        TYPE 100
          C100     FORMAT(1X,'ATC SYSTEM READY')
          C        CALL EXIT
0053               RETURN
          C
          C        DIAGNOSTIC TRAP AREA
          C
0054      10       TYPE 101,INSTR,STATUS
0055               CALL EXIT
0056      101      FORMAT(1X,'***MAP ERROR*** "OUTPUT" INSTR=',I3,' HAS STATUS=',I6/)
0057               END
```

PROGRAM SECTIONS

NAME   SIZE   ATTRIBUTES

```
SCODE1   000466   155          RW,I,CON,LCL
SPDATA   000020     8          RW,D,CON,LCL
SIDATA   000132    45          RW,D,CON,LCL
SVARS    000056    23          RW,D,CON,LCL
STEMPS   000002     1          RW,D,CON,LCL
ATAPE0   002260   600          RW,D,OVR,GBL
ATAPE1   000012     5          RW,D,OVR,GBL
ATAPE2   000012     5          RW,D,OVR,GBL
OVRT     002020   520          RW,D,OVR,GBL
OVRD     002006   515          RW,D,OVR,GBL
OVRF     006016  1543          RW,D,OVR,GBL
OVRA     000152    53          RW,D,OVR,GBL
OVRP     002016   519          RW,D,OVR,GBL
OVRR     005004  1282          RW,D,OVR,GBL
OVR2     001002   257          RW,D,OVR,GBL
OVRL     000016     7          RW,D,OVR,GBL
OVRO     000012     5          RW,D,OVR,GBL
MAPDEF   000200    64          RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025716  5607

NO FPP INSTRUCTIONS GENERATED

OUTPUT,LP/LI:1=OUTPUT/DE/NOTR
```

```
        C        PROGRAM NAME:SNR.FTN      ORIGINATED:05-FEB-79
        C                                           UPDATE:13-MAY-80
        C
        C
        C
        C
0001             SUBROUTINE SNR
0002             REAL NOISE
0003             INTEGER BUS1,BUS2,BUS3
0004             INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                 1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0005             INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,QRPRM,QRDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,QPRM,QTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,OUTB
                 9,RECV,ARQPB,ARQDCT,RIBIT
                 1,DCT1I1,DCT1I2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0006             INTEGER ORDR,START,SIZE,DSW,BTLTH
0007             DIMENSION NIND3(246)
0008             LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0009             COMMON/MTAPE0/NIN(300),NOUT(300)
0010             COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0011             COMMON/MTAPE2/NEND,NEPR,NFILE,NINS,NOUTS
0012             COMMON/DELAY/M4,M3,M2,M1,IV4,IV3,IV2,IV1
0013             COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0014             COMMON/OVRO/Y(256),NP,XN
0015             COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0016             COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0017             COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0018             COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0019             COMMON/OVR2/IORDR(256),LTHM1
0020             COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0021             COMMON/OVRF/XR(512)
0022             COMMON/OVRD/CSN,START,SIZE,YES,NO
0023             COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,QRPRM,QRDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,QPRM,QTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,OUTB
                 9,RECV,ARQPB,ARQDCT,RIBIT
                 1,DCT1I1,DCT1I2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
0024             EQUIVALENCE (NIND3(1),XR(1))
        C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0025             DATA REAL,CMPLX,INTGR/0,1,2/
0026             DATA EVERY,SINGLE,DOUBLE/1,2,3/
0027             DATA BYTE2,BYTE4,BYTE8/2,4,8/
```

```
0028             DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0029             DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C        ADD 3 FRAMES DELAY IN INPUT FOR SNR CALCULATION
        C
0030    D        INSTR=0
0031             STATUS=MPRDR(SEN,NIND3(1),BYTE2,CNVYES,NIND3(NTUPS))
0032             STATUS=MPRDR(NIN2,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0033             STATUS=MPWDR(SEN,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0034             STATUS=MPRDR(NIN1,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0035             STATUS=MPWDR(NIN2,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0036             STATUS=MPWDR(NIN1,NIN(1),BYTE2,CNVYES,NIN(NTUPS))
0037    D        IF(STATUS.NE.0)GO TO 10
        C        NOW DELAY M & VUV FOR CONSISTENCY
0038             M4=M3
0039             M3=M2
0040             M2=M1
0041             M1=M
0042             IV4=IV3
0043             IV3=IV2
0044             IV2=IV1
0045             IV1=IFIX(VU)
        C
        C
        C        COMPUTE S/N RATIO
        C
0046             SUM1=0.0
0047             SUM2=0.0
        C        NIN(1) MATCHES NOUT(NP+1), ERGO NTUPS-NP MATCHES!
0048             DO 3605 I=1,NIOTO-NP
0049             SOURCE=FLOAT(NIND3(I))
0050             SIGNAL=FLOAT(NOUT(NP+I))
0051             NOISE=SIGNAL-SOURCE
0052             SUM1=SUM1+SOURCE**2
0053    3605     SUM2=SUM2+NOISE**2
0054             SN=0.0
0055             FRNUM=ICOUNT-START+1
0056             IF(FRNUM.LT.4)GO TO 200
0057             SN=10.0*ALOG10(SUM1/SUM2)
0058             IF(FRNUM.EQ.4)CSN=SN
0059             CSN=((FRNUM-1.)/FRNUM)*CSN+(1./FRNUM)*SN
        C200     WRITE(3,255)ICOUNT,SN,CSN,M4,IV4
        C        WRITE(5,255)ICOUNT,SN,CSN,M4,IV4
0060    255      FORMAT(1X,'FRAME=',I3,3X,'SN=',F6.2,3X,'CSN=',F6.2,3X
                 1,'PITCH=',I3,'    &    VUV=',I2)
0061    200      CONTINUE
0062             RETURN
        C
        C        DIAGNOSTIC TRAP AREA
        C
0063    10       TYPE 100,INSTR,STATUS
0064             CALL EXIT
0065    100      FORMAT(1X,'***MAP ERROR*** "SNR" INSTR=',I3,' HAS STATUS=',I6/)
0066             END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000720	232	RW,I,CON,LCL
$IDATA	000162	57	RW,D,CON,LCL
$VARS	000110	36	RW,D,CON,LCL
$TEMPS	000002	1	RW,D,CON,LCL
$TAPE0	002260	600	RW,D,OVR,GBL
$TAPE1	000012	5	RW,D,OVR,GBL
$TAPE2	000012	5	RW,D,OVR,GBL
DELAY	000020	8	RW,D,OVR,GBL
OVR1	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026236 5711

SNR,LP/LI:1=SNR/OF/NOTR

```
FORTRAN IV-PLUS V02-51E          11:41:28     10-AUG-80           PAGE 1
TAPE2.FTN          /WR

              SUBROUTINE TAPE2(IQ)
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
              1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
              DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
              DATA MASK/0377/
              DATA MT0/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
              GO TO (700,800,900,1100,1000,1200,1300,1400),IQ
        700   CALL OPT1
              RETURN
        800   CALL OPT2
              RETURN
        900   CALL OPT3
              RETURN
        1100  CALL OPT4
              RETURN
        1000  CALL OPT5
              RETURN
        1200  CALL OPT6
              RETURN
        1300  CALL OPT7
              RETURN
        1400  CALL OPT8
              CALL OPT3
              IF(APPEND)CALL OPT4
              RETURN
              END

PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

$CODE1   000226    75           RW,I,CON,LCL
$PDATA   000022     9           RW,D,CON,LCL
$IDATA   000002     1           RW,D,CON,LCL
MTAPE0   002260   600           RW,D,OVR,GBL
MTAPE1   000012     5           RW,D,OVR,GBL
MTAPE2   000012     5           RW,D,OVR,GBL
MTAPE3   012260  2648           RW,D,OVR,GBL
MTAPE4   000004                 RW,D,OVR,GBL
MTAPE5   000064    26           RW,D,OVR,GBL
MTAPE6   000002     1           RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015130   3372
```

```
NO FPP INSTRUCTIONS GENERATED

TAPE2,LP/LI:1=TAPE2/NOTR
```

```
0001            SUBROUTINE OPT1
0002            IMPLICIT INTEGER(A-Z)
0003            LOGICAL*1 APPEND
0004            COMMON/MTAPE0/NIN(300),NOUT(300)
0005            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0006            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0007            COMMON/MTAPE3/NBF(1324),NBUF(1324)
0008            COMMON/MTAPE4/LST,IBEG
0009            COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
                1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
0010            COMMON/MTAPE6/APPEND
0011            DIMENSION ICARD(64)
0012            DATA IOATT,IOSUC,IEALN/0001400,1,-34/
0013            DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
0014            DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
0015            DATA MASK/0377/
0016            DATA MT0/0,2048,0,0,0,0/
0017            DATA MT1/0,2048,0,0,0,0/
        C
        C       INPUT DATA(=1)
        C
0018    700     CONTINUE
0019            IST=IST+NTUPS
0020            IF(1324.GE.IST) GO TO 200
0021    100     IST=IST-1024
0022            NSKIP=NSKIP+1
0023    200     KOVER=LST+NTOT1-1325
0024            IF(KOVER.GT.0) GO TO 305
0025            DO 5000 I=1,NTOT1
0026    5000    NIN(I)=NBF(LST+I-1)
0027            LST=LST+NTUPS
0028            GO TO 6002
0029    305     IPEP=LST-1024
0030            DO 5001 I=1,300
0031    5001    NBF(IPEP+I-1)=NBF(LST+I-1)
0032            LST=IPEP
0033            IF(NINS.EQ.0) GO TO 2100
        C>>>>>>>DISK INPUT
0034            DO 5010 I=1,16
0035            READ(2,END=2001,ERR=6000)(ICARD(J),J=1,64)
0036            K=64*(I-1)+300
0037            DO 5010 J=1,64
0038    5010    NBF(K+J)=ICARD(J)
0039            IF(NERR.NE.0) GO TO 6000
0040            GO TO 200
0041    2001    NEND=1
0042            GO TO 200
        C>>>>>>>TAPE INPUT
0043    2100    NEND=0
0044            NERR=0
0045            CALL GETADR(MTO,NBF(301))
0046            CALL WTQIO(IORLB,2,1,0,ISW,MTO,DSW)
0047            IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 200
0048            IF(IAND(IEEOF,MASK).EQ.IAND(MASK,ISW(1)))NEND=1
0049            IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))NERR=1
0050            GO TO 200
```

```
0051    6000     TYPE 6001
0052    6001     FORMAT(1X,'***INPUT FILE ERROR***'/)
0053             NERR=1
0054    6002     RETURN
0055             END
```

PROGRAM SECTIONS

```
 NAME       SIZE                ATTRIBUTES

$CODE1  000646   211           RW,I,CON,LCL
$PDATA  000014     6           RW,D,CON,LCL
$IDATA  000062    25           RW,D,CON,LCL
$VARS   000212    69           RW,D,CON,LCL
MTAPE0  002260   600           RW,D,OVR,GBL
MTAPE1  000012     5           RW,D,OVR,GBL
MTAPE2  000012     5           RW,D,OVR,GBL
MTAPE3  012260  2648           RW,D,OVR,GBL
MTAPE4  000004     2           RW,D,OVR,GBL
MTAPE5  000064    26           RW,D,OVR,GBL
MTAPE6  000002     1           RW,D,OVR,GBL
```

TOTAL SPACE ALLOCATED = 016034 3598

NO FPP INSTRUCTIONS GENERATED

OPT1,LP/LI:1=OPT1/NOTR

```
              SUBROUTINE OPT2
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
              1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION ICARD(64)
              DATA IOATT,IOSUC,IEALN/O001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/O2400,O400,-4,O2440,O1000     /
              DATA IOSPF,IEEOF,IOEOF/O2440,-10,O3000/
              DATA MASK/O377/
              DATA MT0/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
      C
      C       OUTPUT DATA(=2)
      C
      800     CONTINUE
              DO 5005 I=1,NTOTO
      5005    NBUF(IBEG+I-1)=NOUT(I)
              IBEG=IBEG+NTOTO
              KON=1025-IBEG
              IF(KON.GT.0) GO TO 6002
              IF(NOUTS.EQ.0) GO TO 2002
      C>>>>>>>DISK OUTPUT
              DO 6010 I=1,16
              K=64*(I-1)
              DO 6011 J=1,64
      6011    ICARD(J)=NBUF(K+J)
      6010    WRITE(3)(ICARD(J),J=1,64)
              GO TO 2003
      C>>>>>>>TAPE OUTPUT
      2002    NERR=0
              CALL GETADR(MT1,NBUF)
              CALL WTQIO(IOWLB,3,1,0,ISW(1),MT1,DSW)
              IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 2003
              IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))NERR=1
      2003    LRESID=-KON
              DO 5006 I=1,LRESID
      5006    NBUF(I)=NBUF(1024+I)
              IBEG=LRESID+1
              RETURN
      6000    TYPE 6001
      6001    FORMAT(1X,'***OUTPUT FILE ERROR***'/)
              NERR=1
      6002    RETURN
              END
```

PROGRAM SECTIONS

NAME   SIZE   ATTRIBUTES

```
$CODE1   000432   141        RW,I,CON,LCL
$PDATA   000014     6        RW,D,CON,LCL
$IDATA   000062    25        RW,D,CON,LCL
$VARS    000212    69        RW,D,CON,LCL
.TAPE0   002260   600        RW,D,OVR,GBL
.TAPE1   000012     5        RW,D,OVR,GBL
.TAPE2   000012     5        RW,D,OVR,GBL
.TAPE3   012260  2648        RW,D,OVR,GBL
.TAPE4   000004     2        RW,D,OVR,GBL
.TAPE5   000064    26        RW,D,OVR,GBL
.TAPE6   000002     1        RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015620  3528

NO FPP INSTRUCTIONS GENERATED

OPT2,LP/LI:1=OPT2/NOTR
```

```
              SUBROUTINE OPT3
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
             1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION ICARD(64)
              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
              DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
              DATA MASK/0377/
              DATA MTO/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
      C
      C       INITIALIZE(=3)
      C
      900     CONTINUE
              NEND=0
              NERR=0
              IF((NINS+NOUTS).GT.1)GO TO 901
              UNIT=0
              DO 902 LUN=2,3
              IF(NINS.NE.0.AND.LUN.EQ.2)GO TO 902
              IF(NOUTS.NE.0.AND.LUN.EQ.3)GO TO 902
      C>>>>>>>MT: ATTACH
              CALL ASNLUN(LUN,'MT',UNIT,DSW)
              IF(DSW.NE.1)GO TO 6000
              CALL WTQIO(IOATT,LUN,1,0,ISW(1),0,DSW)
              IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 902
              IF(IAND(IEALN,MASK).NE.IAND(MASK,ISW(1)))GO TO 6000
      902     UNIT=UNIT+1
      901     DO 903 LUN=2,3
              IF(NINS.NE.0.AND.LUN.EQ.2)GO TO 903
              IF(NOUTS.NE.0.AND.LUN.EQ.3)GO TO 903
      C>>>>>>>MT: REWIND
              CALL WTQIO(IORWD,LUN,1,0,ISW(1),0,DSW)
              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6001
      903     CONTINUE
              IF(NFILE.EQ.0)GO TO 995
              IF(NINS.NE.0)GO TO 913
      C>>>>>>>MT: FILE SKIP
              DO 907 I=1,NFILE-1
              CALL GETADR(MTO,NBF(301))
              CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6003
              MTO(1)=1
      907     CALL WTQIO(IOSPF,2,1,0,ISW(1),MTO,DSW)
      913     DO 912 J=1,NSKIP
              IF(NINS.EQ.0)GO TO 910
      C>>>>>>>DISK INPUT
              DO 914 I=1,16
```

```
          READ(2,END=905,ERR=6002)(ICARD(JJ),JJ=1,64)
          K=64*(I-1)+300
          DO 914 JJ=1,64
914       NBF(K+JJ)=ICARD(JJ)
          GO TO 912
C>>>>>>>TAPE INPUT
910       CALL GETADR(MTO,NBF(301))
          CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
          IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 912
          IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))GO TO 6002
          IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 912
905       NEND=1
912       CONTINUE
995       IBEG=1
          LST=IST+300
          IST=IST-NTUPS
          RETURN
6000      TYPE 100
          GO TO 6010
6001      TYPE 101
          GO TO 6010
6002      TYPE 102
          GO TO 6010
6003      TYPE 103
6010      NERR=1
          RETURN
100       FORMAT(1X,'*** MT: ATTACH FAILURE! ***'/)
101       FORMAT(1X,'*** MT: REWIND FAILURE! ***'/)
102       FORMAT(1X,'*** INPUT FILE "NSKIP" FAILURE! ***'/)
103       FORMAT(1X,'*** MT: "NFILE" FAILURE! ***'/)
          END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	001212	325	RW,I,CON,LCL
$PDATA	000020	8	RW,D,CON,LCL
$IDATA	000332	109	RW,D,CON,LCL
$VARS	000214	70	RW,D,CON,LCL
$TEMPS	000004	2	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016662 3801

NO FPP INSTRUCTIONS GENERATED

OPT3,LP/LI:1=OPT3/NOTR

```
        SUBROUTINE OPT4
        IMPLICIT INTEGER(A-Z)
        LOGICAL*1 APPEND
        COMMON/MTAPE0/NIN(300),NOUT(300)
        COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
        COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
        COMMON/MTAPE3/NBF(1324),NBUF(1324)
        COMMON/MTAPE4/LST,IBEG
        COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
        1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
        COMMON/MTAPE6/APPEND
        DIMENSION ICARD(64)
        DATA IOATT,IOSUC,IEALN/0001400,1,-34/
        DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000    /
        DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
        DATA MASK/0377/
        DATA MT0/0,2048,0,0,0,0/
        DATA MT1/0,2048,0,0,0,0/
C
C       OUTPUT FILE SKIP(=4)
C
1100    CONTINUE
        NERR=0
        NEND=0
        IBEG=1
1       CALL GETADR(MT1(1),NBUF(1))
        CALL WTQIO(IORLB,3,1,0,ISW(1),MT1,DSW)
        IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 1
        IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 6000
        CALL GETADR(MT1(1),NBUF(1))
        CALL WTQIO(IORLB,3,1,0,ISW(1),MT1,DSW)
        IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 1
        IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 6000
        MT1(1)=-1
        CALL WTQIO(IOSPF,3,1,0,ISW(1),MT1,DSW)
        RETURN
6000    TYPE 100
        RETURN
100     FORMAT(1X,'*** OUTPUT "APPEND" FAILURE! ***'/)
        END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000224	74	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000114	38	RW,D,CON,LCL
$VARS	000200	64	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL

```
NTAPE6  000002      1              RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015432  3469

NO FPP INSTRUCTIONS GENERATED

OPT4,LP/LI:1=OPT4/NOTR
```

```
              SUBROUTINE OPTS
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
              1,IOWLB,IEVER,IOSPF,IEFOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION ICARD(64)
              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
              DATA IOSPF,IEFOF,IOEOF/02440,-10,03000/
              DATA MASK/0377/
              DATA MT0/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
        C
        C     END-OF-FILE(=5)
        C
        1000  CONTINUE
              NERR=0
              NEND=0
              IF(NOUTS.EQ.0)GO TO 1001
        C>>>>>>>>DISK EOF
              CALL CLOSE(3)
              GO TO 1003
        C>>>>>>>>TAPE EOF
        1001  DO 1002 I=1,2
        1002  CALL WTQIO(IOEOF,3,1,0,ISW(1))
              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6000
              MT1(1)=-1
              CALL WTQIO(IOSPF,3,1,0,ISW(1),MT1,DSW)
              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6000
        1003  IBEG=1
              RETURN
        6000  TYPE 100
              NERR=1
              RETURN
        100   FORMAT(1X,'*** MT: EOF FAILURE! ***'/)
              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000204	66	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000076	31	RW,D,CON,LCL
$VARS	000202	65	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL

```
FORTRAN IV-PLUS V02-51E          11:42:01    10-AUG-80          PAGE 2
OPT5.FTN           /WR

$TAPE4  000004      2              RW,D,OVR,GBL
$TAPE5  000064     26              RW,D,OVR,GBL
$TAPE6  000002      1              RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015376  3455

NO FPP INSTRUCTIONS GENERATED

OPT5,LP/LI:1=OPT5/NOTR
```

```
0001              SUBROUTINE OPT6
0002              IMPLICIT INTEGER(A-Z)
0003              LOGICAL*1 APPEND
0004              COMMON/MTAPE0/NIN(300),NOUT(300)
0005              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0006              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0007              COMMON/MTAPE3/NBF(1324),NBUF(1324)
0008              COMMON/MTAPE4/LST,IBEG
0009              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
                  1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
0010              COMMON/MTAPE6/APPEND
0011              DIMENSION ICARD(64)
0012              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
0013              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000    /
0014              DATA IOSPF, EEOF,IOEOF/02440,-10,03000/
0015              DATA MASK/0377/
0016              DATA MT0/0,2048,0,0,0,0/
0017              DATA MT1/0,2048,0,0,0,0/
            C
            C     REWIND/SEARCH INPUT ONLY(=6)
            C
0018        1200  CONTINUE
0019              NEND=0
0020              NERR=0
0021              IF(NINS.EQ.0)GO TO 1222
            C>>>>>>>DISK REWIND
0022              REWIND 2
0023              GO TO 1203
            C>>>>>>>MT: REWIND
0024        1222  CALL WTQIO(IORWD,2,1,0,ISW(1),0,DSW)
0025              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6002
0026        1203  IF(NFILE.LE.1)GO TO 1204
0027              DO 1205 I=1,NFILE-1
0028              CALL GETADR(MTO,NBF(301))
0029              CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
0030              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6000
0031              MTO(1)=1
0032        1205  CALL WTQIO(IOSPF,2,1,0,ISW(1),MTO,DSW)
0033        1204  DO 1210 J=1,NSKIP
0034              IF(NINS.EQ.0)GO TO 1201
            C>>>>>>>DISK SEARCH
0035              DO 1207 I=1,16
0036              READ(2,END=1202,ERR=6001)(ICARD(JJ),JJ=1,64)
0037              K=64*(I-1)+300
0038              DO 1207 JJ=1,64
0039        1207  NBF(K+JJ)=ICARD(JJ)
0040              GO TO 1210
            C>>>>>>>TAPE SEARCH
0041        1201  CALL GETADR(MTO,NBF(301))
0042              CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
0043              IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 1210
0044              IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))GO TO 6000
0045              IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 1210
0046        1202  NEND=1
0047              GO TO 6000
0048        1210  CONTINUE
```

```
                LST=IST+300
                IST=IST-NTUPS
                RETURN
        6000    TYPE 100
                GO TO 6010
        6001    TYPE 101
                GO TO 6010
        6002    TYPE 102
        6010    NERR=1
                RETURN
        100     FORMAT(1X,'*** INPUT FILE "NSKIP" FAILURE! ***'/)
        101     FORMAT(1X,'*** INPUT FILE "NFILE" FAILURE! ***'/)
        102     FORMAT(1X,'*** MT: REWIND FAILURE! ***'/)
                END
```

```
PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1   000712    229          RW,I,CON,LCL
$PDATA   000014      6          RW,D,CON,LCL
$IDATA   000246     83          RW,D,CON,LCL
$VARS    000210     68          RW,D,CON,LCL
$TEMPS   000004      2          RW,D,CON,LCL
MTAPE0   002260    600          RW,D,OVR,GBL
MTAPE1   000012      5          RW,D,OVR,GBL
MTAPE2   000012      5          RW,D,OVR,GBL
MTAPE3   012260   2648          RW,D,OVR,GBL
MTAPE4   000004      2          RW,D,OVR,GBL
MTAPE5   000064     26          RW,D,OVR,GBL
MTAPE6   000002      1          RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016266  3675

NO FPP INSTRUCTIONS GENERATED

OPT6,LP/LI:1=OPT6/NOTR
```

```
FORTRAN IV-PLUS V02-51F          11:42:14     10-AUG-80           PAGE 1
OPT7.FTN            /WR

0001                SUBROUTINE OPT7
0002                IMPLICIT INTEGER(A-Z)
0003                LOGICAL*1 APPEND
0004                COMMON/MTAPE0/NIN(300),NOUT(300)
0005                COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0006                COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0007                COMMON/MTAPE3/NBF(1324),NBUF(1324)
0008                COMMON/MTAPE4/LST,IBEG
0009                COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
                    1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
0010                COMMON/MTAPE6/APPEND
0011                DIMENSION ICARD(64)
0012                DATA IOATT,IOSUC,IEALN/0001400,1,-34/
0013                DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
0014                DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
0015                DATA MASK/0377/
0016                DATA MT0/0,2048,0,0,0,0/
0017                DATA MT1/0,2048,0,0,0,0/
          C
          C         CLOSE INPUT FILE
          C
0018      1300      CONTINUE
0019                NEND=0
0020                NERR=0
0021                IF(NINS.EQ.1)CALL CLOSE(2)
0022                RETURN
0023                END

PROGRAM SECTIONS

 NAME        SIZE                ATTRIBUTES

SCODE1   000032    13            RW,I,CON,LCL
SPDATA   000004     2            RW,D,CON,LCL
SIDATA   000004     2            RW,D,CON,LCL
SVARS    000200    64            RW,D,CON,LCL
MTAPE0   002260   600            RW,D,OVR,GBL
MTAPE1   000012     5            RW,D,OVR,GBL
MTAPE2   000012     5            RW,D,OVR,GBL
MTAPE3   012260  2648            RW,D,OVR,GBL
MTAPE4   000004     2            RW,D,OVR,GBL
MTAPE5   000064    26            RW,D,OVR,GBL
MTAPE6   000002     1            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015120   3368

NO FPP INSTRUCTIONS GENERATED

OPT7,LP/LI:1=OPT7/NOTR
```

```
0001              SUBROUTINE OPTR
0002              IMPLICIT INTEGER(A-Z)
0003              LOGICAL*1 EXTIN,EXTOUT,APPEND
0004              COMMON/MTAPE0/NIN(300),NOUT(300)
0005              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0006              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0007              COMMON/MTAPE3/NBF(1324),NBUF(1324)
0008              COMMON/MTAPE4/LST,IBEG
0009              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
                  1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
0010              COMMON/MTAPE6/APPEND
0011              DIMENSION EXTIN(3),EXTOUT(3)
0012              DIMENSION ICARD(64)
0013              DATA YES,NO/'Y','N'/
0014              DATA EXTIN/'I','N','P'/
0015              DATA EXTOUT/'O','U','T'/
0016              DATA NEND,NERR,NFILE/0,0,0/
0017              DATA NSKIP,IST/1,1/
0018              DATA IOATT,IOSUC,IEALN/O001400,1,-34/
0019              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/O2400,O400,-4,O2440,O1000     /
0020              DATA IOSPF,IEEOF,IOEOF/O2440,-10,O3000/
0021              DATA MASK/O377/
0022              DATA MT0/0,2048,0,0,0,0/
0023              DATA MT1/0,2048,0,0,0,0/
            C
            C     GET FILE INFO(=8)
            C
0024              APPEND=.FALSE.
0025        900   TYPE 100
0026        100   FORMAT(//1H$,'IS THE INPUT ON MAG. TAPE(Y/N)? ')
0027              READ(5,102,END=999,ERR=900)ANSER
0028        102   FORMAT(A1)
0029              NINS=1
0030              IF(ANSER.EQ.NO)NINS=1
0031              NOUTS=1
0032        901   TYPE 103
0033        103   FORMAT(1H$'IS THE OUTPUT GOING TO MAG TAPE(Y/N)? ')
0034              READ(5,102,END=999,ERR=901)ANSER
0035              IF(ANSER.EQ.NO)NOUTS=1
0036              IF(NOUTS.EQ.1)GO TO 5
0037        902   TYPE 104
0038        104   FORMAT(1H$,'APPEND DATA? ')
0039              READ (5,102,END=999,ERR=902)ANSER
0040              IF(ANSER.EQ.YES)APPEND=.TRUE.
0041        5     IF(NOUTS.EQ.0)GO  TO 151
            C     RSX11  SUPPORTED FILE
0042        903   TYPE 105
0043        105   FORMAT(1H$,'OUTPUT FILE NAME= ')
0044              CALL FILEN(3,EXTOUT)
            C
            C     BEGINNING OF INPUT
            C
0045        151   IF(NINS.EQ.1)GO TO 155
0046        904   TYPE 106
0047        106   FORMAT(1H$'MT FILE NO.=(I3) ')
0048              READ(5,101,END=999,ERR=904)NFILE
```

```
0049    101     FORMAT(I3)
0050            GO TO 14
0051    155     TYPE 107
0052    107     FORMAT(1HS,'INPUT FILE NAME= ')
0053            CALL FILEN(2,EXTIN)
0054            NFILE=1
0055    14      RETURN
0056    999     CALL EXIT
0057            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000524	170	RW,I,CON,LCL
$PDATA	000010	4	RW,D,CON,LCL
$IDATA	000300	96	RW,D,CON,LCL
$VARS	000214	70	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016126 3627

NO FPP INSTRUCTIONS GENERATED

```
0001            SUBROUTINE FILEN(UNIT,EXT)
          C     THIS SUBROUTINE ACCEPTS THE NAME OF THE INPUT OR OUTPUT FILE
          C     FORM THE TTY DEVICE 5
          C     DEFAULT DEVICE
          C     UNLESS SPECIFIED IN INPUT STRING
          C     UNIT=UNIT NUMBER
          C     EXT = LOGICAL*1 BUFFER OF EXTENSION
          C
0002            IMPLICIT INTEGER(A-Z)
0003            LOGICAL*1 INSTR,DOT,BLNK,EXT
0004            DIMENSION INSTR(40)
0005            DIMENSION EXT(3)
0006            DATA BLNK,DOT/' ','.'/
          C
          C     INPUT FILE
0007      152   READ (5,99,END=999,ERR=152)(INSTR(I),I=1,40)
0008      99    FORMAT(40A1)
          C     CHECK FOR END OF LINE
0009            DO 1600 I=40,1,-1
0010            J=I
0011      1600  IF(INSTR(I).NE.BLNK)GO TO 1601
0012            TYPE 151
0013      151   FORMAT(1H$,'>')
0014            GO TO 152
0015      1601  DO 1602 I=1,J
0016            IF(INSTR(I).NE.BLNK) GO TO 1602
          C
          C
          C     BLANK DISCOVERED-COLLAPSE LINE BY ONE AND DECREASE CHARACTER COUNT
          C
0017            DO 1603 K=I,J-1
0018      1603  INSTR(K)=INSTR(K+1)
0019            INSTR(J)=BLNK
0020            J=J-1
0021            GO TO 1601
0022      1602  CONTINUE
0023            DO 103 I=1,J
0024      103   IF(INSTR(I).EQ.DOT) GO TO 25
0025            INSTR(J+1)=DOT
0026            INSTR(J+2)=EXT(1)
0027            INSTR(J+3)=EXT(2)
0028            INSTR(J+4)=EXT(3)
0029            J=J+4
0030      25    CALL SCAN(INSTR,J)
0031            CALL ASSIGN(UNIT,INSTR,J)
0032            RETURN
0033      999   CALL EXIT
0034            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000472	157	RW,I,CON,LCL
$IDATA	000044	18	RW,D,CON,LCL

```
FORTRAN IV-PLUS V02-51E          11:42:22    10-AUG-80          PAGE 4
OPTR.FTN          /WR

$VARS    000060    24           RW,D,CON,LCL
$TEMPS   000004     2           RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000622   201

NO FPP INSTRUCTIONS GENERATED
```

```
FORTRAN IV-PLUS V02-51F          11:42:25     10-AUG-80             PAGE 5
OPTR.FTN          /WR

      C
                  SUBROUTINE SCAN(BUF,LTH)
                  IMPLICIT INTEGER(A-Z)
                  LOGICAL*1 BUF,DEVICE
                  DIMENSION BUF(1),DEVICE(4)
                  DATA DEVICE/'S','Y','0',':'/
                  DO 1 I=1,LTH
      1           IF(BUF(I).EQ.DEVICE(4))RETURN
                  LTH=LTH+4
                  DO 2 I=LTH,5,-1
      2           BUF(I)=BUF(I-4)
                  DO 3 I=1,4
      3           BUF(I)=DEVICE(I)
                  RETURN
                  END

PROGRAM SECTIONS

 NAME       SIZE                   ATTRIBUTES

$CODE1   000172     61             RW,I,CON,LCL
$IDATA   000012      5             RW,D,CON,LCL
$VARS    000006      3             RW,D,CON,LCL
$TEMPS   000002      1             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000214     70

NO FPP INSTRUCTIONS GENERATED

OPTR,LP/LI:1=OPTR/NOTR
```

```
              SUBROUTINE OPTR
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 EXTIN,EXTOUT,APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
     1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION EXTIN(3),EXTOUT(3)
              DIMENSION ICARD(64)
              DATA YES,NO/'Y','N'/
              DATA EXTIN/'I','N','P'/
              DATA EXTOUT/'O','U','T'/
              DATA NEND,NERR,NFILE/0,0,0/
              DATA NSKIP,IST/1,1/
              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
              DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
              DATA MASK/0377/
              DATA MT0/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
        C
        C     GET FILE INFO(=8)
        C
              APPEND=.FALSE.
        C900  TYPE 100
        C100  FORMAT(//1HS,'IS THE INPUT ON MAG. TAPE(Y/N)? ')
        C     READ(5,102,END=999,ERR=900)ANSER
              ANSER=NO
        102   FORMAT(A1)
              NINS=1
              IF(ANSER.EQ.NO)NINS=1
              NOUTS=1
        C901  TYPE 103
        C103  FORMAT(1HS'IS THE OUTPUT GOING TO MAG TAPE(Y/N)? ')
        C     READ(5,102,END=999,ERR=901)ANSER
              ANSER=NO
              IF(ANSER.EQ.NO)NOUTS=1
              IF(NOUTS.EQ.1)GO TO 5
        902   TYPE 104
        104   FORMAT(1HS,'APPEND DATA? ')
              READ (5,102,END=999,ERR=902)ANSER
              IF(ANSER.EQ.YES)APPEND=.TRUE.
        5     IF(NOUTS.EQ.0)GO  TO 151
        C     RSX11  SUPPORTED FILE
        C903  TYPE 105
        C105  FORMAT(1HS,'OUTPUT FILE NAME= ')
        C     CALL FILEN(3,EXTOUT)
              CALL ASSIGN(3,'NL:')
        C
        C     BEGINNING OF INPUT
        C
        151   IF(NINS.EQ.1)GO TO 155
```

```
 904     TYPE 106
 106     FORMAT(1HS'MT FILE NO.=(I3) ')
         READ(5,101,END=999,ERR=904)NFILE
 101     FORMAT(I3)
         GO TO 14
 155     CONTINUE
C155     TYPE 107
C107     FORMAT(1HS,'INPUT FILE NAME= ')
C        CALL FILEN(2,EXTIN)
         CALL ASSIGN(2,'15,100]VOICEA.BIN',17)
         NFILE=1
 14      RETURN
 999     CALL EXIT
         END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000330	108	RW,I,CON,LCL
$PDATA	000042	17	RW,D,CON,LCL
$IDATA	000100	32	RW,D,CON,LCL
$VARS	000214	70	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015564 3514

NO FPP INSTRUCTIONS GENERATED

```
0001            SUBROUTINE FILEN(UNIT,EXT)
        C       THIS SUBROUTINE ACCEPTS THE NAME OF THE INPUT OR OUTPUT FILE
        C       FORM THE TTY DEVICE 5
        C       DEFAULT DEVICE
        C       UNLESS SPECIFIED IN INPUT STRING
        C       UNIT=UNIT NUMBER
        C       EXT = LOGICAL*1 BUFFER OF EXTENSION
        C
0002            IMPLICIT INTEGER(A-Z)
0003            LOGICAL*1 INSTR,DOT,BLNK,EXT
0004            DIMENSION INSTR(40)
0005            DIMENSION EXT(3)
0006            DATA BLNK,DOT/' ','.'/
        C
        C       INPUT FILE
0007    152     READ (5,99,END=999,ERR=152)(INSTR(I),I=1,40)
0008    99      FORMAT(40A1)
        C       CHECK FOR END OF LINE
0009            DO 1600 I=40,1,-1
0010            J=I
0011    1600    IF(INSTR(I).NE.BLNK)GO TO 1601
0012            TYPE 151
0013    151     FORMAT(1H$,'>')
0014            GO TO 152
0015    1601    DO 1602 I=1,J
0016            IF(INSTR(I).NE.BLNK) GO TO 1602
        C
        C
        C       BLANK DISCOVERED-COLLAPSE LINE BY ONE AND DECREASE CHARACTER COUNT
        C
0017            DO 1603 K=I,J-1
0018    1603    INSTR(K)=INSTR(K+1)
0019            INSTR(J)=BLNK
0020            J=J-1
0021            GO TO 1601
0022    1602    CONTINUE
0023            DO 103 I=1,J
0024    103     IF(INSTR(I).EQ.DOT) GO TO 25
0025            INSTR(J+1)=DOT
0026            INSTR(J+2)=EXT(1)
0027            INSTR(J+3)=EXT(2)
0028            INSTR(J+4)=EXT(3)
0029            J=J+4
0030    25      CALL SCAN(INSTR,J)
0031            CALL ASSIGN(UNIT,INSTR,J)
0032            RETURN
0033    999     CALL EXIT
0034            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000472	157	RW,I,CON,LCL
$IDATA	000044	18	RW,D,CON,LCL

```
FORTRAN IV-PLUS V02-51E          21:16:25    11-SEP-80          PAGE 4
OPTRA.FTN        /DE/WR

$VARS   000060    24            RW,D,CON,LCL
$TEMPS  000004     2            RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000622   201

NO FPP INSTRUCTIONS GENERATED
```

```
C
      SUBROUTINE SCAN(BUF,LTH)
      IMPLICIT INTEGER(A-Z)
      LOGICAL*1 BUF,DEVICE
      DIMENSION BUF(1),DEVICE(4)
      DATA DEVICE/'S','Y','0',':'/
      DO 1 I=1,LTH
1     IF(BUF(I).EQ.DEVICE(4))RETURN
      LTH=LTH+4
      DO 2 I=LTH,5,-1
2     BUF(I)=BUF(I-4)
      DO 3 I=1,4
3     BUF(I)=DEVICE(I)
      RETURN
      END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000172	61	RW,I,CON,LCL
SIDATA	000012	5	RW,D,CON,LCL
SVARS	000006	3	RW,D,CON,LCL
STEMPS	000002	1	RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000214 70

NO FPP INSTRUCTIONS GENERATED

OPTRA,LP/LI:1=OPTRA/DE/NOTR

```
        C       PREMAP.FTN      ORIGINATED:29-MAY-79
        C                       UPDATED:04-JUN-79
        C       THIS PROGRAM INTERPRETS ASCII TEXT FILES FOR THE MAP
        C       ASSEMBLER AND ALIGNS ALL FIELDS W/ SPACES AND REMOVES
        C       ALL TABS. ALL FILES ARE ASSUMED TO BE 120 COLUMNS WIDE.
        C       OUTPUT LINE FORMAT:
        C       COLUMNS 1,2...7             LABEL
        C       COLUMN 8                    BLANK
        C       COLUMNS 9,10...55           SOURCE CODE
        C       COLUMN 56                   BLANK
        C       COLUMNS 57,58...120         COMMENTS
        C
0001            BYTE BLANK,TAB,HYPHEN,STAR,CR,DUMMY,SCOLON
0002            BYTE ALAST
0003            BYTE A(200),L(200)
0004            LOGICAL*1 IN(3),OUT(3),OUTPUT
0005            DATA IN/'T','X','T'/,OUT/'M','A','P'/
0006            DATA BLANK,TAB,HYPHEN,STAR,CR,SCOLON/040,011,047,052,015,073/
        C
0007    2       TYPE 100
0008            CALL FILEN(2,IN)
0009            TYPE 101
0010            CALL FILEN(3,OUT)
0011            LINE=0
        C
        C       READ EACH SOURCE "LINE"
        C
0012    1       LINE=LINE+1
0013            OUTPUT=.TRUE.
0014            READ(2,102,END=200,ERR=300)(A(I),I=1,120)
        C
        C       "BLANK" OUT OUTPUT LINE
        C
0015            DO 10 I=1,120
0016    10      L(I)=BLANK
        C
        C       SPECIAL LINE OPERATORS
        C
0017            IF(A(1).EQ.HYPHEN)GO TO 70
0018            IF(A(1).EQ.STAR)GO TO 70
0019            IF(A(1).EQ.SCOLON)GO TO 70
        C
        C       LABEL FIELD
        C
0020            I=1
0021    11      IF(A(I).EQ.TAB)GO TO 12
0022            L(I)=A(I)
0023            I=I+1
0024            IF(I.GT.120)GO TO 80
0025            GO TO 11
0026    12      NEXT=I+1
        C
        C       COMMAND FIELD
        C
0027            J=0
0028            I=NEXT
```

```
21      IF(A(I).EQ.TAB)GO TO 22
        L(9+J)=A(I)
        J=J+1
        IF(J.GT.111)GO TO 80
        I=I+1
        IF(I.GT.120)GO TO 80
        GO TO 21
22      NEXT=I+1
C
C       COMMENT FIELD
C
30      K=0
        I=NEXT
31      IF(A(I).EQ.TAB)GO TO 80
        IF(ALAST.EQ.BLANK.AND.A(I).EQ.BLANK)GO TO 80
        IF(A(I).EQ.CR)GO TO 80
        ALAST=A(I)
        OUTPUT=.TRUE.
        L(57+K)=A(I)
        K=K+1
        IF(K.LE.23)GO TO 32
        WRITE(3,106)(L(II),II=1,120)
        DO 33 II=1,120
33      L(II)=BLANK
        L(1)=SCOLON
        K=0
        OUTPUT=.FALSE.
        ALAST=BLANK
32      I=I+1
        IF(I.GT.120)GO TO 80
        GO TO 31
C
C       COPY LINE "EN TOTO"
C
70      DO 71 I=1,120
71      L(I)=A(I)
C
C       GENERATE CORRECTED OUTPUT LINE
C
80      IF(OUTPUT.EQ..TRUE.)WRITE(3,106)(L(I),I=1,120)
        GO TO 1
C
C       NORMAL EXIT
C
200     CALL CLOSE(2)
        CALL CLOSE(3)
        TYPE 103,LINE
        STOP
C
C       ABNORMAL EXIT
C
300     CALL CLOSE(2)
        CALL CLOSE(3)
        TYPE 104,LINE
        GO TO 2
C
```

```
FORTRAN IV-PLUS V02-51E          13:17:26     10-AUG-80            PAGE 3
PREMAP.FTN       /TR:BLOCKS/WR

        C        LINE STRUCTURE ERROR
        C
0069    400      CALL CLOSE(2)
0070             CALL CLOSE(3)
0071             TYPE 105,LINE
0072             STOP
        C
        C        FORMAT DECLARATIONS
        C
0073    100      FORMAT(1H$,'INPUT FILENAME= ')
0074    101      FORMAT(1H$,'OUTPUT FILENAME= ')
0075    102      FORMAT(120A1)
0076    103      FORMAT(1X,'NORMAL EXIT AFTER ',I3,' LINES!'/)
0077    104      FORMAT(1X,'***WARNING*** FILE ERROR IN LINE ',I3/)
0078    105      FORMAT(1X,'***WARNING*** LINE STRUCTURE ERROR IN LINE ',I3/)
0079    106      FORMAT(120A1)
0080    107      FORMAT(1X,100S)
0081             END

PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  001374   382              RW,I,CON,LCL
$PDATA  000010     4              RW,D,CON,LCL
$IDATA  000304    98              RW,D,CON,LCL
$VARS   000654   214              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 002564   698

NO FPP INSTRUCTIONS GENERATED

PREMAP,LP/LI:1=PREMAP
```

```
FORTRAN IV-PLUS V02-51E          13:28:11     10-AUG-80          PAGE 1
FILEN.FTN         /WR

0001                SUBROUTINE FILEN(UNIT,EXT)
          C
          C         THIS SUBROUTINE ACCEPTS THE NAME OF THE INPUT OR OUTPUT FILE
          C         FORM THE TTY DEVICE 5
          C         DEFAULT DEVICE
          C         UNLESS SPECIFIED IN INPUT STRING
          C         UNIT=UNIT NUMBER
          C         EXT = LOGICAL*1 BUFFER OF EXTENSION
          C
0002                IMPLICIT INTEGER(A-Z)
0003                LOGICAL*1 INSTR,DOT,BLNK,EXT
0004                DIMENSION INSTR(40)
0005                DIMENSION EXT(3)
0006                DATA BLNK,DOT/' ','.'/
          C
          C         INPUT FILE
0007      152       READ (5,99)(INSTR(I),I=1,40)
0008      99        FORMAT(40A1)
          C         CHECK FOR END OF LINE
0009                DO 1600 I=40,1,-1
0010                J=I
0011      1600      IF(INSTR(I).NE.BLNK)GO TO 1601
0012                TYPE 151
0013      151       FORMAT(1H$,'>')
0014                GO TO 152
0015      1601      DO 1602 I=1,J
0016                IF(INSTR(I).NE.BLNK) GO TO 1602
          C
          C
          C         BLANK DISCOVERED-COLLAPSE LINE BY ONE AND DECREASE CHARACTER COUNT
          C
0017                DO 1603 K=I,J-1
0018      1603      INSTR(K)=INSTR(K+1)
0019                INSTR(J)=BLNK
0020                J=J-1
0021                GO TO 1601
0022      1602      CONTINUE
0023                DO 103 I=1,J
0024      103       IF(INSTR(I).EQ.DOT) GO TO 25
0025                INSTR(J+1)=DOT
0026                INSTR(J+2)=EXT(1)
0027                INSTR(J+3)=EXT(2)
0028                INSTR(J+4)=EXT(3)
0029                J=J+4
0030      25        CALL SCAN(INSTR,J)
0031                CALL ASSIGN(UNIT,INSTR,J)
0032                RETURN
0033                END

PROGRAM SECTIONS

 NAME        SIZE                ATTRIBUTES

$CODE1  000444    146            RW,I,CON,LCL
$IDATA  000042     17            RW,D,CON,LCL
```

```
FILEN.FTN        /WR

$VARS   000060    24        RW,D,CON,LCL
$TEMPS  000004     2        RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000572   189

NO FPP INSTRUCTIONS GENERATED
```

```
      C
                SUBROUTINE SCAN(BUF,LTH)
                IMPLICIT INTEGER(A-Z)
                LOGICAL*1 BUF,DEVICE
                DIMENSION BUF(1),DEVICE(4)
                DATA DEVICE/'S','Y','0',':'/
                DO 1 I=1,LTH
        1       IF(BUF(I).EQ.DEVICE(4))RETURN
                LTH=LTH+4
                DO 2 I=LTH,5,-1
        2       BUF(I)=BUF(I-4)
                DO 3 I=1,4
        3       BUF(I)=DEVICE(I)
                RETURN
                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000172	61	RW,I,CON,LCL
$IDATA	000012	5	RW,D,CON,LCL
$VARS	000006	3	RW,D,CON,LCL
$TEMPS	000002	1	RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000214   70

NO FPP INSTRUCTIONS GENERATED

FILEN,LP/LI:1=FILEN/NOTR

END

DATE FILMED

12-80

DTIC

AD-A091 663 GTE PRODUCTS CORP NEEDHAM HEIGHTS MA COMMUNICATION S--ETC F/G 5/8
SPEECH OPTIMIZATION AT 9600 BITS/SECOND. VOLUME 2. REAL-TIME SO--ETC(U)
SEP 80 A J GOLDBERG, L COSELL, S KWON DCA100-78-C-0064

UNCLASSIFIED NL

9 OF 9

AD
A091663

END
DATE
FILMED
12-80
DTIC

```
C        SCAN DCT LIST FOR ALL SIGNIFICANT POINTS
C        PRELIMINARY BIT ASSIGNMENT TO TMP1
C
D        INSTR=1
         STATUS=MPSCAN(DCTM2)
D        IF(STATUS.NE.0)GO TO 10
C
C        RESULTS
C
D        CALL MPRST(R0,CTEMP,1,CNVYES)
D        CALL MPRST(R2,BITSMN,1,CNVYES)
D        CALL MPRST(R3,XITOT,1,CNVYES)
D        ITOT=IFIX(XITOT)
D        WRITE(6,930)BITSMN,CTEMP,ITOT
D930     FORMAT(/1X,'BITS= ',F15.8,' W/ CTEMP=',F15.8,' @ ITOT= ',I3)
D        CALL MPRDB(TMP1,XR(1),BYTE4,CNVYES,XR(LTH))
D        WRITE(6,911)(I,IFIX(XR(I)),I=1,LTH)
D911     FORMAT(/1X,6(1X,'IBIT(',I3,')=',I3,2X))
         RETURN
C
C        DIAGNOSTIC TRAP AREA
C
10       TYPE 100,INSTR,STATUS
         CALL EXIT
100      FORMAT(1X,'***MAP ERROR*** "SDCT" INSTR=',I3,' HAS STATUS=',I6/)
         END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000344	114	RW,I,CON,LCL
SPDATA	000020	8	RW,D,CON,LCL
SIDATA	000250	84	RW,D,CON,LCL
SVARS	000064	26	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025722   5609

SDCT,LP/LI:1=SDCT/DE/NOTR

```
FORTRAN IV-PLUS V02-51E         13:30:46    09-AUG-80           PAGE 1
BITA.FTN           /DE/WR

        C          PROGRAM NAME:BITA.FTN   ORIGINATED:05-FEB-79
        C                                             UPDATE:23-MAY-80
        C
        C
        C
        C
0001               SUBROUTINE BITA
0002               INTEGER BUS1,BUS2,BUS3
0003               INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                   1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004               INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,DRDCTM,YNM,QRPRM,QRDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,QPRM,QTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AQPB,AQTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,AROPB,AROQDCT,RIBIT
                   1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C          <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005               INTEGER ORDR,START,SIZE,DSW,BTLTH
0006               LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007               COMMON/SECTIO/MODUL
0008               COMMON/MTAPE0/NIN(300),NOUT(300)
0009               COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0010               COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011               COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012               COMMON/OVRO/Y(256),NP,XN
0013               COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014               COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015               COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016               COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017               COMMON/OVR2/IORDR(256),LTHM1
0018               COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019               COMMON/OVRF/XR(512)
0020               COMMON/OVRD/CSN,START,SIZE,YES,NO
0021               COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,DRDCTM,YNM,QRPRM,QRDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,QPRM,QTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AQPB,AQTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,AROPB,AROQDCT,RIBIT
                   1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C          >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0022               DATA TMP3,TMP4/46,47/
0023               DATA REAL,CMPLX,INTGR/0,1,2/
0024               DATA EVERY,SINGLE,DOUBLE/1,2,3/
0025               DATA BYTE2,BYTE4,BYTE8/2,4,8/
0026               DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0027               DATA BUS1,BUS2,BUS3/64,128,192/
```

```
         C
         C        ASSIGN BITS TO DCT ELEMENTS
         C
         C        ANALYSIS:MODUL=1,SYNTHESIS:MODUL=2
0028     D        INSTR=1
0029              IF(MODUL.EQ.1)STATUS=MPCDBA(MIBIT3)
0030              IF(MODUL.EQ.2)STATUS=MPCDBA(MIBIT1)
0031     D        IF(STATUS.NE.0)GO TO 10
         C
         C        RESULTS
         C
0032     D        IF(MODUL.EQ.1)CALL MPRDB(MIBIT3,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0033     D        IF(MODUL.EQ.2)CALL MPRDB(MIBIT1,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0034     D        IF(STATUS.NE.0)GO TO 10
0035     D        WRITE(6,911)(I,IBIT(I),I=1,LTH)
0036     D911     FORMAT(/1X,6(1X,'IBIT(',I3,')=',I3,2X))
0037              RETURN
         C
         C        DIAGNOSTIC TRAP AREA
         C
0038     10       TYPE 100,INSTR,STATUS
0039              CALL EXIT
0040     100      FORMAT(1X,'***MAP ERROR*** "BITA" INSTR=',I3,' HAS STATUS=',I6/)
0041              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000334	110	RW,I,CON,LCL
$IDATA	000160	56	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
SECTIO	000002	1	RW,D,OVR,GBL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025574 5566

NO FPP INSTRUCTIONS GENERATED

BITA,LP/LI:1=BITA/DE/NOTR

```
        C       PROGRAM NAME:QDCT.FTN   ORIGINATED:10-SEP-79
        C                                          UPDATE:23-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE QDCT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X11,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            INTEGER QTDCT,QTPAR,QTDC,QTVAR,QTM,QTG,QTV
0007            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008            COMMON/MTAPE0/NIN(300),NOUT(300)
0009            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0010            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,VO,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/OVRQT/QTDCT(256),QTPAR(8),QTDC,QTVAR,QTM,QTG,QTV
0022            COMMON/OVRDT/DTDCT(256),DTPAR(8),DTDC,DTVAR,DTM,DTG,DTV,DTA(8)
0023            COMMON/MAPDEF/WORK,X1,X1R,X11,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0024            DATA REAL,CMPLX,INTGR/0,1,2/
0025            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0026            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0027            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
```

```
0028            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       QUANTIZE DCT(.) W/ IBIT(.) ACCORDING TO IORDR(.)
        C
0029    D       INSTR=1
0030            STATUS=MPESTQ(QTDCTM,MIBIT3,TMP1,TMP2)
0031    D       IF(STATUS.NE.0)GO TO 10
        C
        C       RESULTS
        C
0032    D       DO 21 I=1,LTH
0033    D21     IORDR(I)=IORDR(I)+1
0034    D       CALL MPRDB(QTDCTM,NOUT(1),BYTE2,CNVYES,NOUT(LTH))
0035    D       DO 22 I=1,LTH
0036    D       J=IORDR(I)
0037    D       QTDCT(J)=NOUT(I)
0038    D22     NOUT(I)=0
0039    D       WRITE(6,912)(I,QTDCT(I),I=1,LTH)
0040    D912    FORMAT(/1X,4(1X,'QTDCT(',I3,')=',I3,2X))
0041    D       CALL MPRDB(MIBIT3,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0042    D       WRITE(6,913)(I,IBIT(I),I=1,LTH)
0043    D913    FORMAT(/1X,4(1X,'MIBIT3(',I3,')=',I3,2X))
0044            RETURN
        C
        C       DIAGNOSTIC TRAP AREA
        C
0045    10      TYPE 100,INSTR,STATUS
0046            CALL EXIT
0047    100     FORMAT(1X,'***MAP ERROR*** "QDCT" INSTR=',I3,' HAS STATUS=',I6/)
0048            END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000446	147	RW,I,CON,LCL
$IDATA	000216	71	RW,D,CON,LCL
$VARS	000056	23	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
OVRQT	001032	269	RW,D,OVR,GBL
OVRDT	002124	554	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

```
TOTAL SPACE ALLOCATED = 031122  6441

NO FPP INSTRUCTIONS GENERATED

QDCT,LP/LI:1=QDCT/DE/NOTR
```

```
         C        PROGRAM NAME:CHANL.FTN  ORIGINATED:10-SEP-79
         C                                        UPDATE:13-MAY-80
         C
         C
         C
         C
0001              SUBROUTINE CHANL
0002              INTEGER BUS1,BUS2,BUS3
0003              INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                  1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004              INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                  1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                  2,DRDCTM,YNM,QRPRM,ORDCTM
                  3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                  4,MIBIT,DCTM,QPRM,QTDCTM
                  5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                  6,RECV1,RECV2,SEN1,SEN2
                  7,AQPB,AQTDCT,AIBIT,SEN,INPB
                  8,SYNB1,SYNB2,BF1,BF2,OUTB
                  9,RECV,AROPB,ARODCT,RIBIT
                  1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
         C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005              INTEGER ORDR,START,SIZE,DSW,BTLTH
0006              LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007              COMMON/MTAPE0/NIN(300),NOUT(300)
0008              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010              COMMON/CHANEL/IAQPB(14),IAQDCT(256)
0011              COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012              COMMON/OVRO/Y(256),NP,XN
0013              COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014              COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015              COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016              COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017              COMMON/OVR2/IORDR(256),LTHM1
0018              COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019              COMMON/OVRF/XR(512)
0020              COMMON/OVRD/CSN,START,SIZE,YES,NO
0021              COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                  1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                  2,DRDCTM,YNM,QRPRM,ORDCTM
                  3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                  4,MIBIT,DCTM,QPRM,QTDCTM
                  5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                  6,RECV1,RECV2,SEN1,SEN2
                  7,AQPB,AQTDCT,AIBIT,SEN,INPB
                  8,SYNB1,SYNB2,BF1,BF2,OUTB
                  9,RECV,AROPB,ARODCT,RIBIT
                  1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
         C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0022              DATA REAL,CMPLX,INTGR/0,1,2/
0023              DATA EVERY,SINGLE,DOUBLE/1,2,3/
0024              DATA BYTE2,BYTE4,BYTE8/2,4,8/
0025              DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0026              DATA BUS1,BUS2,BUS3/64,128,192/
         C
```

```
0027     D        WRITE(6,699)ICOUNT
0028     D699     FORMAT(1H1,40(1H>),'RECEIVE FRAME # ',I4,40(1H<))
         C
         C        PASS DATA W/ NO ERRORS
         C
0029     D        INSTR=1
0030              STATUS=MPWDB(AROQCT,IAQDCT(1),BYTE2,CNVYES,IAQDCT(LTH))
0031     D        IF(STATUS.NE.0)GO TO 10
0032     D        INSTR=2
0033              STATUS=MPWDB(AROPB,IAQPB(1),BYTE2,CNVYES,IAQPB(LPARM+1))
0034     D        IF(STATUS.NE.0)GO TO 10
0035     D        WRITE(6,899)
0036     D899     FORMAT(/1X,'*** MODEM OUTPUT ***')
0037     D        WRITE(6,900)(IAQPB(I),I=1,LPARM)
0038     D900     FORMAT(/1X,6(1X,'AROPB(',I2,')=',I6,2X))
0039     D        WRITE(6,901)(IAQDCT(I),I=1,LTH)
0040     D901     FORMAT(/1X,6(1X,'ARODCT(',I3,')=',I6,2X))
         C
         C        ADD TRANSMISSION DELAY
         C
0041     D        INSTR=3
0042              STATUS=MPRDB(AQTDCT,IAQDCT(1),BYTE2,CNVYES,IAQDCT(LTH))
0043     D        IF(STATUS.NE.0)GO TO 10
0044     D        INSTR=4
0045              STATUS=MPRDB(AQPB,IAQPB(1),BYTE2,CNVYES,IAQPB(LPARM+1))
0046     D        IF(STATUS.NE.0)GO TO 10
0047     D        WRITE(6,799)
0048     D799     FORMAT(/1X,'*** MODEM INPUT ***')
0049     D        WRITE(6,800)(IAQPB(I),I=1,LPARM)
0050     D800     FORMAT(/1X,6(1X,'AQPB(',I2,')=',I6,2X))
0051     D        WRITE(6,801)(IAQDCT(I),I=1,LTH)
0052     D801     FORMAT(/1X,6(1X,'AQTDCT(',I3,')=',I6,2X))
0053              RETURN
         C
         C        DIAGNOSTIC TRAP AREA
         C
0054     10       TYPE 100,INSTR,STATUS
0055              CALL EXIT
0056     100      FORMAT(1X,'***MAP ERROR*** "CHANL" INSTR=',I3,' HAS STATUS=',I6/)
0057              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000644	210	RW,I,CON,LCL
$IDATA	000452	149	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
CHANEL	001034	270	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRD	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL

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OVRA     000152     53              RW,D,OVR,GBL
OVRP     002022    521              RW,D,OVR,GBL
OVRB     005004   1282              RW,D,OVR,GBL
OVR2     001002    257              RW,D,OVR,GBL
OVRL     000016      7              RW,D,OVR,GBL
OVRD     000012      5              RW,D,OVR,GBL
NAPDEF   000200     64              RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 027430  6028

NO FPP INSTRUCTIONS GENERATED

CHANL.LP/LI:1=CHANL/DE/NOTR
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```
        C       PROGRAM NAME:DPARM.FTN  ORIGINATED:10-SEP-79
        C                                        UPDATE:13-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE DPARM
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,AROOCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            INTEGER ORDCT,QRPAR,ORDC,QRVAR,QRM,QRG,QRV
0007            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0008            COMMON/MTAPE0/NIN(300),NOUT(300)
0009            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0010            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0011            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0012            COMMON/OVRO/Y(256),NP,XN
0013            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0014            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0015            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0016            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0017            COMMON/OVR2/IORDR(256),LTHM1
0018            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0019            COMMON/OVRF/XR(512)
0020            COMMON/OVRD/CSN,START,SIZE,YES,NO
0021            COMMON/OVRDT/DRDCT(256),DRPAR(8),DRDC,DRVAR,DRM,DRG,DRV,DRA(8)
0022            COMMON/OVROT/ORDCT(256),QRPAR(8),QRDC,QRVAR,QRM,QRG,QRV
0023            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,AROOCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0024            DATA REAL,CMPLX,INTGR/0,1,2/
0025            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0026            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0027            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
```

```
                DATA BUS1,BUS2,BUS3/64,128,192/
      C
      C         SIDEBAND DEQUANTIZATION LAGS SIDEBAND DESERIALIZATION
      C         BY 1 FRAME DUE TO CSPU IN BACKGROUND
      C
      D         INSTR=1
                STATUS=VMOV2(ORPRM)
      D         IF(STATUS.NE.0)GO TO 10
      C
      C         DEQUANTIZE PARCOR(J),J=1,...,LPCN,G,M,VUV
      C
      D         INSTR=2
                STATUS=MPDQPP(PARC,ORPRM,A1)
      D         IF(STATUS.NE.0)GO TO 10
      C
      C         RESULTS
      C
      D         CALL MPRDB(ORPRM,IBIT(1),BYTE2,CNVYES,IBIT(LPARM+1))
      D         WRITE(6,927)(J,IBIT(J),J=1,LPARM)
      D927      FORMAT(/1X,4(1X,'ORPRM(',I2,')=',I6,2X))
      D         CALL MPRDB(PARC,DRPAR(1),BYTE4,CNVYES,DRPAR(LPCN))
      D         WRITE(6,928)(J,DRPAR(J),J=1,LPCN)
      D928      FORMAT(/1X,4(1X,'DRK(',I2,')=',E15.8,2X))
      D         CALL MPRST(88,DRDC,1,CNVYES)
      D         CALL MPRST(89,DRVAR,1,CNVYES)
      D         CALL MPRST(90,DRG,1,CNVYES)
      D         CALL MPRST(91,DRM,1,CNVYES)
      D         CALL MPRST(104,DRV,1,CNVYES)
      D         WRITE(6,925)DRDC,DRVAR
      D925      FORMAT(1X,'DRDC(88)=',E15.8,' AND DRVAR(89)=',E15.8)
      D         WRITE(6,929)DRM,DRG,DRV
      D929      FORMAT(/1X,'DRM=',E15.8,', DRG=',E15.8,' AND DRV=',E15.8)
      D         CALL MPRDB(A1,DRA(1),BYTE4,CNVYES,DRA(LPCN))
      D         WRITE(6,931)(J,DRA(J),J=1,LPCN)
      D931      FORMAT(/1X,4(1X,'DRA(',I2,')=',E15.8,2X))
      D         CALL MPRST(60,ENG,1,CNVYES)
      D         WRITE(6,932)ENG
      D932      FORMAT(/1X,'ENG=',E15.8)
      D         CALL MPRDB(ORDCTM,ORDCT(1),BYTE2,CNVYES,ORDCT(LTH))
      D         WRITE(6,940)(I,ORDCT(I),I=1,LTH)
      D940      FORMAT(/1X,4(1X,'ORDCTM(',I3,')=',I6,2X))
      D         CALL MPRDB(MIBIT2,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
      D         WRITE(6,941)(I,IBIT(I),I=1,LTH)
      D941      FORMAT(/1X,4(1X,'MIBIT2(',I3,')=',I6,2X))
      D         CALL MPRDB(IORDR2,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
      D         WRITE(6,942)(I,IORDR(I),I=1,LTH)
      D942      FORMAT(/1X,4(1X,'IORDR2(',I3,')=',I6,2X))
      D         CALL MPRDB(DCTIT2,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
      D         WRITE(6,943)(I,DCT1(I),I=1,LTH)
      D943      FORMAT(/1X,4(1X,'DCT1(',I3,')=',E15.8,2X))
      D         CALL MPRST(100,DRDC,1,CNVYES)
      D         CALL MPRST(101,DRVAR,1,CNVYES)
      D         WRITE(6,944)DRDC,DRVAR
      D944      FORMAT(1X,'DRDC(100)=',E15.8,' AND VAR(101)=',E15.8)
                RETURN
      C
```

```
        C        DIAGNOSTIC TRAP AREA
        C
0073    10       TYPE 100,INSTR,STATUS
0074             CALL EXIT
0075    100      FORMAT(1X,'***MAP ERROR*** "DPARM" INSTR=',I4,' HAS STATUS=',I6/)
0076             END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	001542	433	RW,I,CON,LCL
$PDATA	000044	18	RW,D,CON,LCL
$IDATA	001036	271	RW,D,CON,LCL
$VARS	000056	23	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRT	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
OVRDT	002124	554	RW,D,OVR,GBL
OVRQT	001032	269	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 033102   6945

DPARM,LP/LI:1=DPARM/DE/NOTR

```
        C        PROGRAM NAME:SSRT.FTN   ORIGINATED:10-SEP-79
        C                                      UPDATE:07-MAY-80
        C
        C
        C
        C
0001             SUBROUTINE SSRT
0002             INTEGER BUS1,BUS2,BUS3
0003             INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                 1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004             INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,ORPRM,ORDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,QPRM,QTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,OUTB
                 9,RECV,ARQPB,ARQDCT,RIBIT
                 1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005             INTEGER ORDR,START,SIZE,DSW,BTLTH
0006             LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007             COMMON/MTAPE0/NIN(300),NOUT(300)
0008             COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009             COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010             COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011             COMMON/OVRO/Y(256),NP,XN
0012             COMMON/OVRE/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013             COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014             COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015             COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016             COMMON/OVR2/IORDR(256),LTHM1
0017             COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018             COMMON/OVRF/XR(512)
0019             COMMON/OVRD/CSN,START,SIZE,YES,NO
0020             COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                 1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                 2,DRDCTM,YNM,ORPRM,ORDCTM
                 3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                 4,MIBIT,DCTM,QPRM,QTDCTM
                 5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                 6,RECV1,RECV2,SEN1,SEN2
                 7,AQPB,AQTDCT,AIBIT,SEN,INPB
                 8,SYNB1,SYNB2,BF1,BF2,OUTB
                 9,RECV,ARQPB,ARQDCT,RIBIT
                 1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021             DATA REAL,CMPLX,INTGR/0,1,2/
0022             DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023             DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024             DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025             DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C        ORDER DCT1(,) MAX-TO-MIN W/ ORDERING INFO IN IORDR(,)
```

```
        C        SORT TMP2 TO DCTM2
        C        SORT DCTM1 TO TMP4
        C
0026    D        INSTR=1
0027             STATUS=MPSSRT(IORDRM)
0028    D        IF(STATUS.NE.0)GO TO 10
        C
        C        RESULTS
        C
0029    D        CALL MPRDB(DCTM2,DCT2(1),BYTE4,CNVYES,DCT2(LTH))
0030    D        CALL MPRDB(IORDRM,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
0031    D        WRITE(6,910)(I,IORDR(I),I=1,LTH)
0032    D910     FORMAT(/1X,6(1X,'IORDR(',I3,')=',I3,2X))
0033    D        WRITE(6,909)(I,DCT2(I),I=1,LTH)
0034    D909     FORMAT(/1X,4(1X,'DCT2(',I3,')=',E15.8,2X))
0035    D        CALL MPRDB(TMP4,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0036    D        WRITE(6,911)(I,DCT1(I),I=1,LTH)
0037    D911     FORMAT(/1X,4(1X,'DCT1T(',I3,')=',E15.8,2X))
0038             RETURN
        C
        C        DIAGNOSTIC TRAP AREA
        C
0039    10       TYPE 100,INSTR,STATUS
0040             CALL EXIT
0041    100      FORMAT(1X,'***MAP ERROR*** "SSRT" INSTR=',I3,' HAS STATUS=',I6/)
0042             END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000470	156	RW,I,CON,LCL
$IDATA	000256	87	RW,D,CON,LCL
$VARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026024 5642

NO FPP INSTRUCTIONS GENERATED

SSRT,LP/LI:1=SSRT/DE/NOTR

```
        C       PROGRAM NAME:DDCT.FTN   ORIGINATED:05-FEB-79
        C                                        UPDATE:13-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE DDCT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,AROQCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRF/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/OVRDT/DTDCT(256),DTPAR(8),DTDC,DTVAR,DTM,DTG,DTV,DTA(8)
0021            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,AROQCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0022            DATA REAL,CMPLX,INTGR/0,1,2/
0023            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0024            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0025            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0026            DATA BUS1,BUS2,BUS3/64,128,192/
        C
```

```
              C         DEQUANTIZATION OF MAINBAND LAGS MAINBAND DESERIALIZATION
              C         BY 1 FRAME DUE TO CSPU IN THE BACKGROUND
              C
0027          D         INSTR=1
              C         GIVE CSPU BIT ASSIGNMENT FOR UNPACKING OF MAINBAND
0028                    STATUS=VMOV3(RIBIT)
0029          D         IF(STATUS.NE.0)GO TO 10
              C
              C         DEQUANTIZE DCT(1)
              C
0030          D         INSTR=2
0031                    STATUS=MPESTD(DRDCTM,ORDCTM,TMP1,IORDR2)
0032          D         IF(STATUS.NE.0)GO TO 10
              C
              C         RESULTS
              C
0033          D         CALL MPRDB(DRDCTM,DTDCT(1),BYTE4,CNVYES,DTDCT(LTH))
0034          D         WRITE(6,934)(I,DTDCT(I),I=1,LTH)
0035          D934      FORMAT(/1X,4(1X,'DRDCTM(',I3,')=',E15.8,2X))
0036          D         CALL MPRDB(RIBIT,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0037          D         WRITE(6,935)(I,IBIT(I),I=1,LTH)
0038          D935      FORMAT(/1X,4(1X,'RIBIT(',I3,')=',I6,2X))
0039          D         CALL MPRDB(DCT1T1,DCT1(1),BYTE4,CNVYES,DCT1(LTH))
0040          D         WRITE(6,936)(I,DCT1(I),I=1,LTH)
0041          D936      FORMAT(/1X,4(1X,'DCT1T1(',I3,')=',E15.8,2X))
0042          D         CALL MPRDB(IORDR1,IORDR(1),BYTE2,CNVYES,IORDR(LTH))
0043          D         WRITE(6,937)(I,IORDR(I),I=1,LTH)
0044          D937      FORMAT(/1X,4(1X,'IORDR1(',I3,')=',I6,2X))
0045          D         CALL MPRDB(MIBIT1,IBIT(1),BYTE2,CNVYES,IBIT(LTH))
0046          D         WRITE(6,938)(I,IBIT(I),I=1,LTH)
0047          D938      FORMAT(/1X,4(1X,'MIBIT1(',I3,')=',I6,2X))
0048          D         CALL MPRST(102,DRDC,1,CNVYES)
0049          D         CALL MPRST(103,DRVAR,1,CNVYES)
0050          D         WRITE(6,940)DRDC,DRVAR
0051          D940      FORMAT(1X,'DRDC(102)=',E15.8,2X,' AND DRVAR(103)=',E15.8)
0052                    RETURN
              C
              C         DIAGNOSTIC TRAP AREA
              C
0053          10        TYPE 100,INSTR,STATUS
0054                    CALL EXIT
0055          100       FORMAT(1X,'***MAP ERROR*** "DDCT" INSTR=',I4,' HAS STATUS=',I6/)
0056                    END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	001056	279	RW,I,CON,LCL
SPDATA	000014	6	RW,D,CON,LCL
SIDATA	000506	163	RW,D,CON,LCL
SVARS	000064	26	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL

```
OVRI     002020   520           RW,D,OVR,GBL
OVRO     002006   515           RW,D,OVR,GBL
OVRF     006016  1543           RW,D,OVR,GBL
OVRA     000152    53           RW,D,OVR,GBL
OVRP     002022   521           RW,D,OVR,GBL
OVRR     005004  1282           RW,D,OVR,GBL
OVR2     001002   257           RW,D,OVR,GBL
OVRL     000016     7           RW,D,OVR,GBL
OVRD     000012     5           RW,D,OVR,GBL
OVRDT    002124   554           RW,D,OVR,GBL
MAPDEF   000200    64           RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 031012  6405

DDCT,LP/LI:1=DDCT/DE/NOTR
```

```
        C       PROGRAM NAME:DCTR.FTN   ORIGINATED:05-FEB-79
        C                                         UPDATE:12-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE DCTR
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DSW,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,VU,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRF/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,ORPRM,ORDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,OPRM,OTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AOPB,AOTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,AROPB,ARODCT,RIBIT
                1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,OTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       FORM INPHASE & QUADRATURE COMPONENTS
```

```
      C
0026  D       INSTR=1
0027          STATUS=MPIDCM(X2,DRDCTM,COSZ)
0028  D       IF(STATUS.NE.0)GO TO 10
0029  D       CALL MPRDB(X2,XR(1),BYTE8,CNVYES,XR(LTH2))
0030  D       WRITE(6,914)(I,XR(I),I=1,LTH2)
0031  D       INSTR=2
0032          STATUS=FFTIN(X2,1,X2,VSHRT,WORK)
0033  D       IF(STATUS.NE.0)GO TO 10
      C
      C       RESULTS
      C
0034  D       CALL MPRDB(X2,XR(1),BYTE4,CNVYES,XR(LTH))
0035  D       WRITE(6,914)(I,XR(+I),I=1,LTH)
0036  D914    FORMAT(/1X,4(1X,'X(',I3,')=',E15.8,2X))
0037          RETURN
      C
      C       DIAGNOSTIC TRAP AREA
      C
0038  10      TYPE 100,INSTR,STATUS
0039          CALL EXIT
0040  100     FORMAT(1X,'***MAP ERROR*** "DCTR" INSTR=',I3,' HAS STATUS=',I6/)
0041          END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000406	131	RW,I,CON,LCL
SPDATA	000004	2	RW,D,CON,LCL
SIDATA	000172	61	RW,D,CON,LCL
SVARS	000054	22	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025662 5593

DCTR,LP/LI:1=DCTR/DE/NOTR

```
FORTRAN IV-PLUS V02-51F          13:31:39     09-AUG-80            PAGE 1
VARDC.FTN           /DE/WR

          C        PROGRAM NAME:VARDC.FTN             ORIGINATED:17-SEP-79
          C                                                UPDATE:09-MAY-80
          C
          C
          C
          C
0001               SUBROUTINE VARDC
0002               INTEGER BUS1,BUS2,BUS3
0003               INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                   1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004               INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,DRDCTM,YNM,ORPRM,QRDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,QPRM,QTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AQPB,AQTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,ARQPB,ARQDCT,RIBIT
                   1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
          C        <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005               INTEGER ORDR,START,SIZE,DSW,BTLTH
0006               LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007               COMMON/MTAPE0/NIN(300),NOUT(300)
0008               COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0009               COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010               COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011               COMMON/OVRO/Y(256),NP,XN
0012               COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013               COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014               COMMON/OVRP/M,G,VU,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015               COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016               COMMON/OVR2/IORDR(256),LTHM1
0017               COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018               COMMON/OVRF/XR(512)
0019               COMMON/OVRD/CSN,START,SIZE,YES,NO
0020               COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                   1,DCTM2,R1,A1,KE,PARC,TMP1,TMP2,TMP3,TMP4,X2
                   2,DRDCTM,YNM,QRPRM,QRDCTM
                   3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                   4,MIBIT,DCTM,QPRM,QTDCTM
                   5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                   6,RECV1,RECV2,SEN1,SEN2
                   7,AQPB,AQTDCT,AIBIT,SEN,INPB
                   8,SYNB1,SYNB2,BF1,BF2,OUTB
                   9,RECV,ARQPB,ARQDCT,RIBIT
                   1,DCT1T1,DCT1T2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
          C        >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021               DATA REAL,CMPLX,INTGR/0,1,2/
0022               DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023               DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024               DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025               DATA BUS1,BUS2,BUS3/64,128,192/
          C
0026      D        INSTR=1
```

```
0027                  STATUS=MPVDNM(NOUTM,YOM,X2)
0028        D         IF(STATUS.NE.0)GO TO 10
            C
            C         RESULTS
            C
0029        D         CALL MPRST(100,DCBIAS,1,CNVYES)
0030        D         WRITE(6,900)DCBIAS
0031        D900      FORMAT(/1X,'DCBIAS=',F15.8)
0032        D         CALL MPRST(101,VAR,1,CNVYES)
0033        D         WRITE(6,901)VAR
0034        D901      FORMAT(/1X,'VAR=',E15.8)
0035                  RETURN
            C
            C         DIAGNOSTIC TRAP AREA
            C
0036        10        TYPE 101,INSTR,STATUS
0037                  CALL EXIT
0038        101       FORMAT(1X,'***MAP ERROR*** "VARDC" INSTR=',I3,' HAS STATUS=',I6/)
0039                  END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000200	64	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000160	56	RW,D,CON,LCL
$VARS	000052	21	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
OVRI	002020	520	RW,D,OVR,GBL
OVRO	002006	515	RW,D,OVR,GBL
OVRF	006016	1543	RW,D,OVR,GBL
OVRA	000152	53	RW,D,OVR,GBL
OVRP	002022	521	RW,D,OVR,GBL
OVRB	005004	1282	RW,D,OVR,GBL
OVR2	001002	257	RW,D,OVR,GBL
OVRL	000016	7	RW,D,OVR,GBL
OVRD	000012	5	RW,D,OVR,GBL
MAPDEF	000200	64	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025450   5524

NO FPP INSTRUCTIONS GENERATED

VARDC,LP/L1:1=VARDC/DE/NOTR

```
        C       PROGRAM NAME:OUTPUT.FTN ORIGINATED:05-FEB-79
        C                                         UPDATE:09-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE OUTPUT
0002            INTEGER BUS1,BUS2,BUS3
0003            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0004            INTEGER WORK,X1,X1R,X1I,IORDRM,PWFITM,DCTM1
                1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0005            INTEGER ORDR,START,SIZE,DS*,BTLTH
0006            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0007            COMMON/MTAPE0/NIN(300),NOUT(300)
0008            COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0009            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0010            COMMON/OVRI/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0011            COMMON/OVRO/Y(256),NP,XN
0012            COMMON/OVRF/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0013            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0014            COMMON/OVRP/M,G,PWFIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0015            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0016            COMMON/OVR2/IORDR(256),LTHM1
0017            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0018            COMMON/OVRE/XR(512)
0019            COMMON/OVRD/CSN,START,SIZE,YES,NO
0020            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWFITM,DCTM1
                1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCTIT1,DCTIT2,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0021            DATA REAL,CMPLX,INTGR/0,1,2/
0022            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0023            DATA BYTE2,BYTE4,BYTE8/2,4,8/
0024            DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0025            DATA BUS1,BUS2,BUS3/64,128,192/
        C
        C       TRANSFER TO TAPE OUTPUT VECTOR
```

```
              C
              C        CHECK FOR REQUEST FROM "INPUT"
0026                   IF(NEND.NE.0)GO TO 5000
0027          D        INSTR=1
0028                   STATUS=MPAT(1,1)
0029                   STATUS=MPRDB(NOUTB,NOUT(1),BYTE2,CNVYES,NOUT(NTOTO))
0030                   IF(STATUS.NE.0)GO TO 10
              CD       WRITE(6,913)(I,NOUT(I),I=1,NTOTO)
              CD913    FORMAT(/1X,4(1X,'NOUT(',I3,')=',I6,2X))
              C
              C        DATA OUTPUT
              C
0031                   CALL TAPE2(2)
0032                   RETURN
              C
              C        EOF ON INPUT,WRITE EOF
              C
0033          5000     ICOUNT=ICOUNT-1
0034                   DO 5001 I=1,NTOPS
0035          5001     NOUT(I)=0
0036                   DO 5002 I=1,32
0037          5002     CALL TAPE2(2)
0038                   NSKIP=NSKIPS
0039                   NEND=0
0040                   IST=1
0041                   CALL TAPE2(6)
0042                   DO 5005 I=1,ICOUNT
0043                   CALL TAPE2(1)
0044                   IF(NEND)5077,5076,5077
0045          5076     DO 5006 J=1,NTOPS
0046          5006     NOUT(J)=NIN(J)
0047          5005     CALL TAPE2(2)
0048          5077     DO 5007 I=1,NTOPS
0049          5007     NOUT(I)=0
0050                   DO 5008 I=1,8
0051          5008     CALL TAPE2(2)
0052                   CALL TAPE2(5)
              C        CALL MPCLS(0)
              C        TYPE 100,ICOUNT
              C100     FORMAT(1X,'"ATC" DONE AFTER ',I6,' FRAMES!'/)
              C        TYPE 100
              C100     FORMAT(1X,'ATC SYSTEM READY')
              C        CALL EXIT
0053                   RETURN
              C
              C        DIAGNOSTIC TRAP AREA
              C
0054          10       TYPE 101,INSTR,STATUS
0055                   CALL EXIT
0056          101      FORMAT(1X,'***MAP ERROR*** "OUTPUT" INSTR=',I3,' HAS STATUS=',I6/)
0057                   END
```

PROGRAM SECTIONS

NAME	SIZE	ATTRIBUTES

```
SCODE1  000466   155        RW,I,CON,LCL
SPDATA  000020     8        RW,D,CON,LCL
SIDATA  000132    45        RW,D,CON,LCL
SVARS   000056    23        RW,D,CON,LCL
STEMPS  000002     1        RW,D,CON,LCL
ATAPE0  002260   600        RW,D,OVR,GBL
ATAPE1  000012     5        RW,D,OVR,GBL
MTAPE2  000012     5        RW,D,OVR,GBL
OVRI    002020   520        RW,D,OVR,GBL
OVRO    002006   515        RW,D,OVR,GBL
OVRF    006016  1543        RW,D,OVR,GBL
OVRA    000152    53        RW,D,OVR,GBL
OVRP    002016   519        RW,D,OVR,GBL
OVRB    005004  1282        RW,D,OVR,GBL
OVR2    001002   257        RW,D,OVR,GBL
OVRL    000016     7        RW,D,OVR,GBL
OVRD    000012     5        RW,D,OVR,GBL
MAPDEF  000200    64        RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 025716  5607

NO FPP INSTRUCTIONS GENERATED

OUTPUT,LP/LI:1=OUTPUT/DE/NOTR
```

```
        C       PROGRAM NAME:SNR.FTN     ORIGINATED:05-FEB-79
        C                                          UPDATE:13-MAY-80
        C
        C
        C
        C
0001            SUBROUTINE SNR
0002            REAL NOISE
0003            INTEGER BUS1,BUS2,BUS3
0004            INTEGER REAL,CMPLX,INTGR,EVERY,SINGLE,DOUBLE,BYTE2
                1,BYTE4,BYTE8,CNVYES,CNVNO,UNITY,STATUS,SHORT
0005            INTEGER WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCTI11,DCTI12,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
        C       <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
0006            INTEGER ORDR,START,SIZE,DSW,BTLTH
0007            DIMENSION NIND3(246)
0008            LOGICAL*1 TIMING,RLTIM,LIVE,ANSER,YES,NO
0009            COMMON/MTAPE0/NIN(300),NOUT(300)
0010            COMMON/MTAPE1/NSKIP,IST,NTOT1,NTUPS,NTOTO
0011            COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0012            COMMON/DELAY/M4,M3,M2,M1,IV4,IV3,IV2,IV1
0013            COMMON/OVR1/LTH,DCBIAS,VAR,X(256),ICOUNT,IREC,NSKIPS
0014            COMMON/OVRO/Y(256),NP,XN
0015            COMMON/OVRE/DCT(256),LTH2,LTH3,LTH4,ARG,MLONG,MSHRT
0016            COMMON/OVRA/R(9),A(8),PARCOR(8),LPCN,ENG
0017            COMMON/OVRP/M,G,VB,PWEIT(256),TIMING,RLTIM,LIVE,ANSER,LSEN,LPARM
0018            COMMON/OVRB/DCT2(256),DLOG2,DCT1(256),IBIT(256)
0019            COMMON/OVR2/IORDR(256),LTHM1
0020            COMMON/OVRL/SLOG,LNGTH,CTEMP,ITOT,BTLTH
0021            COMMON/OVRF/XR(512)
0022            COMMON/OVRD/CSN,START,SIZE,YES,NO
0023            COMMON/MAPDEF/WORK,X1,X1R,X1I,IORDRM,PWEITM,DCTM1
                1,DCTM2,R1,A1,KF,PARC,TMP1,TMP2,TMP3,TMP4,X2
                2,DRDCTM,YNM,QRPRM,QRDCTM
                3,VLONG,COSZ,VSHRT,YOM,XOM,MAPX
                4,MIBIT,DCTM,QPRM,QTDCTM
                5,NINM,NIN1,NIN2,NOUTM,NOUT1,NOUT2
                6,RECV1,RECV2,SEN1,SEN2
                7,AQPB,AQTDCT,AIBIT,SEN,INPB
                8,SYNB1,SYNB2,BF1,BF2,OUTB
                9,RECV,ARQPB,ARQDCT,RIBIT
                1,DCTI11,DCTI12,IORDR1,IORDR2,MIBIT1,MIBIT2,MIBIT3,MIBIT4,QTDCT1
0024            EQUIVALENCE (NIND3(1),XR(1))
        C       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
0025            DATA REAL,CMPLX,INTGR/0,1,2/
0026            DATA EVERY,SINGLE,DOUBLE/1,2,3/
0027            DATA BYTE2,BYTE4,BYTE8/2,4,8/
```

```
0028           DATA LONG,SHORT,CNVYES,CNVNO/0,1,1,0/
0029           DATA BUS1,BUS2,BUS3/64,128,192/
      C
      C        ADD 3 FRAMES DELAY IN INPUT FOR SNR CALCULATION
      C
0030  D        INSTR=0
0031           STATUS=MPRDB(SEN,NIND3(1),BYTE2,CNVYES,NIND3(NTUPS))
0032           STATUS=MPRDB(NIN2,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0033           STATUS=MPWDB(SEN,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0034           STATUS=MPRDB(NIN1,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0035           STATUS=MPWDB(NIN2,IORDR(1),BYTE2,CNVYES,IORDR(NTUPS))
0036           STATUS=MPWDB(NIN1,NIN(1),BYTE2,CNVYES,NIN(NTUPS))
0037  D        IF(STATUS.NE.0)GO TO 10
      C        NOW DELAY M & VUV FOR CONSISTENCY
0038           M4=M3
0039           M3=M2
0040           M2=M1
0041           M1=M
0042           IV4=IV3
0043           IV3=IV2
0044           IV2=IV1
0045           IV1=IFIX(VU)
      C
      C
      C        COMPUTE S/N RATIO
      C
0046           SUM1=0.0
0047           SUM2=0.0
      C        NIN(I) MATCHES NOUT(NP+I), ERGO NTUPS-NP MATCHES!
0048           DO 3605 I=1,NTOTO-NP
0049           SOURCE=FLOAT(NIND3(I))
0050           SIGNAL=FLOAT(NOUT(NP+I))
0051           NOISE=SIGNAL-SOURCE
0052           SUM1=SUM1+SOURCE**2
0053  3605     SUM2=SUM2+NOISE**2
0054           SN=0.0
0055           FRNUM=ICOUNT-START+1
0056           IF(FRNUM.LT.4)GO TO 200
0057           SN=10.0*ALOG10(SUM1/SUM2)
0058           IF(FRNUM.EQ.4)CSN=SN
0059           CSN=((FRNUM-1.)/FRNUM)*CSN+(1./FRNUM)*SN
      C200     WRITE(4,255)ICOUNT,SN,CSN,M4,IV4
      C        WRITE(5,255)ICOUNT,SN,CSN,M4,IV4
0060  255      FORMAT(1X,'FRAME=',I3,3X,'SN=',F6.2,3X,'CSN=',F6.2,3X
              1,'PITCH=',I3,'   &   VUV=',I2)
0061  200      CONTINUE
0062           RETURN
      C
      C        DIAGNOSTIC TRAP AREA
      C
0063  10       TYPE 100,INSTR,STATUS
0064           CALL EXIT
0065  100      FORMAT(1X,'***MAP ERROR*** "SNR" INSTR=',I3,' HAS STATUS=',I6/)
0066           END
```

```
PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

SCODE1   000720    232          RW,I,CON,LCL
$IDATA   000162     57          RW,D,CON,LCL
$VARS    000110     36          RW,D,CON,LCL
$TEMPS   000002      1          RW,D,CON,LCL
#TAPE0   002260    600          RW,D,OVR,GBL
#TAPE1   000012      5          RW,D,OVR,GBL
#TAPE2   000012      5          RW,D,OVR,GBL
DELAY    000020      8          RW,D,OVR,GBL
OVRI     002020    520          RW,D,OVR,GBL
OVRD     002006    515          RW,D,OVR,GBL
OVRF     006016   1543          RW,D,OVR,GBL
OVRA     000152     53          RW,D,OVR,GBL
OVRP     002022    521          RW,D,OVR,GBL
OVRR     005004   1282          RW,D,OVR,GBL
OVR2     001002    257          RW,D,OVR,GBL
OVRL     000016      7          RW,D,OVR,GBL
OVRD     000012      5          RW,D,OVR,GBL
MAPDEF   000200     64          RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 026236  5711

SNR,LP/LI:1=SNR/OF/NOTR
```

```
FORTRAN IV-PLUS V02-51E          11:41:28     10-AUG-60            PAGE 1
TAPE2.FTN        /WR

                 SUBROUTINE TAPE2(IO)
                 IMPLICIT INTEGER(A-Z)
                 LOGICAL*1 APPEND
                 COMMON/MTAPE0/NIN(300),NOUT(300)
                 COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
                 COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
                 COMMON/MTAPE3/NBF(1324),NBUF(1324)
                 COMMON/MTAPE4/LST,IBEG
                 COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
                 1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),OSW
                 COMMON/MTAPE6/APPEND
                 DATA IOATT,IOSUC,IEALN/O001400,1,-34/
                 DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/O2400,O400,-4,O2440,O1000     /
                 DATA IOSPF,IEEOF,IOEOF/O2440,-10,O3000/
                 DATA MASK/O377/
                 DATA MT0/0,2048,0,0,0,0/
                 DATA MT1/0,2048,0,0,0,0/
                 GO TO (700,800,900,1100,1000,1200,1300,1400),IO
          700    CALL OPT1
                 RETURN
          800    CALL OPT2
                 RETURN
          900    CALL OPT3
                 RETURN
          1100   CALL OPT4
                 RETURN
          1000   CALL OPT5
                 RETURN
          1200   CALL OPT6
                 RETURN
          1300   CALL OPT7
                 RETURN
          1400   CALL OPT8
                 CALL OPT3
                 IF(APPEND)CALL OPT4
                 RETURN
                 END

PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

$CODE1  000226    75            RW,I,CON,LCL
$PDATA  000022     9            RW,D,CON,LCL
$IDATA  000002     1            RW,D,CON,LCL
MTAPE0  002260   600            RW,D,OVR,GBL
MTAPE1  000012     5            RW,D,OVR,GBL
MTAPE2  000012     5            RW,D,OVR,GBL
MTAPE3  012260  2648            RW,D,OVR,GBL
MTAPE4  000004     2            RW,D,OVR,GBL
MTAPE5  000064    26            RW,D,OVR,GBL
MTAPE6  000002     1            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015130   3372
```

```
NO FPP INSTRUCTIONS GENERATED

TAPE2,LP/LI:1=TAPE2/NOTR
```

```
              SUBROUTINE OPT1
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
              1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION ICARD(64)
              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
              DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
              DATA MASK/0377/
              DATA MT0/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
       C
       C      INPUT DATA(=1)
       C
       700    CONTINUE
              IST=IST+NTUPS
              IF(1324.GE.IST) GO TO 200
       100    IST=IST-1024
              NSKIP=NSKIP+1
       200    KOVER=LST+NTOTI-1325
              IF(KOVER.GT.0) GO TO 305
              DO 5000 I=1,NTOTI
       5000   NIN(I)=NBF(LST+I-1)
              LST=LST+NTUPS
              GO TO 6002
       305    IPEP=LST-1024
              DO 5001 I=1,300
       5001   NBF(IPEP+I-1)=NBF(LST+I-1)
              LST=IPEP
              IF(NINS.EQ.0) GO TO 2100
       C>>>>>>>>DISK INPUT
              DO 5010 I=1,16
              READ(2,END=2001,ERR=6000)(ICARD(J),J=1,64)
              K=64*(I-1)+300
              DO 5010 J=1,64
       5010   NBF(K+J)=ICARD(J)
              IF(NERR.NE.0) GO TO 6000
              GO TO 200
       2001   NEND=1
              GO TO 200
       C>>>>>>>>TAPE INPUT
       2100   NEND=0
              NERR=0
              CALL GETADR(MT0,NBF(301))
              CALL WTQIO(IORLB,2,1,0,ISW,MT0,DSW)
              IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 200
              IF(IAND(IEEOF,MASK).EQ.IAND(MASK,ISW(1)))NEND=1
              IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))NERR=1
              GO TO 200
```

```
0051     6000    TYPE 6001
0052     6001    FORMAT(1X,'***INPUT FILE ERROR***'/)
0053             NERR=1
0054     6002    RETURN
0055             END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000646	211	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000062	25	RW,D,CON,LCL
$VARS	000212	69	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016034 3598

NO FPP INSTRUCTIONS GENERATED

OPT1.LP/LI:1=OPT1/NOTR

```
              SUBROUTINE OPT2
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IDATT,IOSUC,IEALN,IORWD
              1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION ICARD(64)
              DATA IDATT,IOSUC,IEALN/O001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/O2400,O400,-4,O2440,O1000     /
              DATA IOSPF,IEEOF,IOEOF/O2440,-10,O3000/
              DATA MASK/O377/
              DATA MT0/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
      C
      C       OUTPUT DATA(=2)
      C
      800     CONTINUE
              DO 5005 I=1,NTOTO
      5005    NBUF(IBEG+I-1)=NOUT(I)
              IBEG=IBEG+NTOTO
              KON=1025-IBEG
              IF(KON.GT.0) GO TO 6002
              IF(NOUTS.EQ.0) GO TO 2002
      C>>>>>>>>DISK OUTPUT
              DO 6010 I=1,16
              K=64*(I-1)
              DO 6011 J=1,64
      6011    ICARD(J)=NBUF(K+J)
      6010    WRITE(3)(ICARD(J),J=1,64)
              GO TO 2003
      C>>>>>>>>TAPE OUTPUT
      2002    NERR=0
              CALL GETADR(MT1,NBUF)
              CALL WTOIO(IOWLB,3,1,0,ISW(1),MT1,DSW)
              IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 2003
              IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))NERR=1
      2003    LRESID=-KON
              DO 5006 I=1,LRESID
      5006    NBUF(I)=NBUF(1024+I)
              IBEG=LRESID+1
              RETURN
      6000    TYPE 6001
      6001    FORMAT(1X,'***OUTPUT FILE ERROR***'/)
              NERR=1
      6002    RETURN
              END
```

PROGRAM SECTIONS

NAME   SIZE   ATTRIBUTES

```
$CODE1   000432   141          RW,I,CON,LCL
$PDATA   000014     6          RW,D,CON,LCL
$IDATA   000062    25          RW,D,CON,LCL
$VARS    000212    69          RW,D,CON,LCL
MTAPE0   002260   600          RW,D,OVR,GBL
MTAPE1   000012     5          RW,D,OVR,GBL
MTAPE2   000012     5          RW,D,OVR,GBL
MTAPE3   012260  2648          RW,D,OVR,GBL
MTAPE4   000004     2          RW,D,OVR,GBL
MTAPE5   000064    26          RW,D,OVR,GBL
MTAPE6   000002     1          RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015620  3528

NO FPP INSTRUCTIONS GENERATED

OPT2.LP/LI:1=OPT2/NOTR
```

```
      SUBROUTINE OPT3
      IMPLICIT INTEGER(A-Z)
      LOGICAL*1 APPEND
      COMMON/MTAPE0/NIN(300),NOUT(300)
      COMMON/MTAPE1/NSKIP,IST,NTOT1,NTOPS,NTOTO
      COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
      COMMON/MTAPE3/NBF(1324),NBUF(1324)
      COMMON/MTAPE4/LST,IBEG
      COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
     1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
      COMMON/MTAPE6/APPEND
      DIMENSION ICAPD(64)
      DATA IOATT,IOSUC,IEALN/0001400,1,-34/
      DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
      DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
      DATA MASK/0377/
      DATA MTO/0,2048,0,0,0,0/
      DATA MT1/0,2048,0,0,0,0/
C
C     INITIALIZE(=3)
C
900   CONTINUE
      NEND=0
      NERR=0
      IF((NINS+NOUTS).GT.1)GO TO 901
      UNIT=0
      DO 902 LUN=2,3
      IF(NINS.NE.0.AND.LUN.EQ.2)GO TO 902
      IF(NOUTS.NE.0.AND.LUN.EQ.3)GO TO 902
C>>>>>>>MT: ATTACH
      CALL ASNLUN(LUN,'MT',UNIT,DSW)
      IF(DSW.NE.1)GO TO 6000
      CALL WTQIO(IOATT,LUN,1,0,ISW(1),0,DSW)
      IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 902
      IF(IAND(IEALN,MASK).NE.IAND(MASK,ISW(1)))GO TO 6000
902   UNIT=UNIT+1
901   DO 903 LUN=2,3
      IF(NINS.NE.0.AND.LUN.EQ.2)GO TO 903
      IF(NOUTS.NE.0.AND.LUN.EQ.3)GO TO 903
C>>>>>>>MT: REWIND
      CALL WTQIO(IORWD,LUN,1,0,ISW(1),0,DSW)
      IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6001
903   CONTINUE
      IF(NFILE.EQ.0)GO TO 995
      IF(NINS.NE.0)GO TO 913
C>>>>>>>MT: FILE SKIP
      DO 907 I=1,NFILE-1
      CALL GETADR(MTO,NBF(301))
      CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
      IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6003
      MTO(1)=1
907   CALL WTQIO(IOSPF,2,1,0,ISW(1),MTO,DSW)
913   DO 912 J=1,NSKIP
      IF(NINS.EQ.0)GO TO 910
C>>>>>>>DISK INPUT
      DO 914 I=1,16
```

```
                READ(2,END=905,ERR=6002)(ICARD(JJ),JJ=1,64)
                K=64*(I-1)+300
                DO 914 JJ=1,64
      914       NBF(K+JJ)=ICARD(JJ)
                GO TO 912
      C>>>>>>>>TAPE INPUT
      910       CALL GETADR(MTO,NBF(301))
                CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
                IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 912
                IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))GO TO 6002
                IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 912
      905       NEND=1
      912       CONTINUE
      995       IBEG=1
                LST=IST+300
                IST=IST-NTUPS
                RETURN
      6000      TYPE 100
                GO TO 6010
      6001      TYPE 101
                GO TO 6010
      6002      TYPE 102
                GO TO 6010
      6003      TYPE 103
      6010      NERR=1
                RETURN
      100       FORMAT(1X,'*** MT: ATTACH FAILURE! ***'/)
      101       FORMAT(1X,'*** MT: REWIND FAILURE! ***'/)
      102       FORMAT(1X,'*** INPUT FILE "NSKIP" FAILURE! ***'/)
      103       FORMAT(1X,'*** MT: "NFILE" FAILURE! ***'/)
                END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	001212	325	RW,I,CON,LCL
$PDATA	000020	8	RW,D,CON,LCL
$IDATA	000332	109	RW,D,CON,LCL
$VARS	000214	70	RW,D,CON,LCL
$TEMPS	000004	2	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016662 3801

NO FPP INSTRUCTIONS GENERATED

OPT3,LP/LI:1=OPT3/NOTR

```
          SUBROUTINE OPT4
          IMPLICIT INTEGER(A-Z)
          LOGICAL*1 APPEND
          COMMON/MTAPE0/NIN(300),NOUT(300)
          COMMON/MTAPE1/NSKIP,IST,NTOT1,NTOPS,NTOTO
          COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
          COMMON/MTAPE3/NBF(1324),NBUF(1324)
          COMMON/MTAPE4/LST,IBEG
          COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
          1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
          COMMON/MTAPE6/APPEND
          DIMENSION ICARD(64)
          DATA IOATT,IOSUC,IEALN/0001400,1,-34/
          DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
          DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
          DATA MASK/0377/
          DATA MT0/0,2048,0,0,0,0/
          DATA MT1/0,2048,0,0,0,0/
C
C         OUTPUT FILE SKIP(=4)
C
1100      CONTINUE
          NERR=0
          NEND=0
          IBEG=1
1         CALL GETADR(MT1(1),NBUF(1))
          CALL WTQIO(IORLB,3,1,0,ISW(1),MT1,DSW)
          IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 1
          IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 6000
          CALL GETADR(MT1(1),NBUF(1))
          CALL WTQIO(IORLB,3,1,0,ISW(1),MT1,DSW)
          IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 1
          IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 6000
          MT1(1)=-1
          CALL WTQIO(IOSPF,3,1,0,ISW(1),MT1,DSW)
          RETURN
6000      TYPE 100
          RETURN
100       FORMAT(1X,'*** OUTPUT "APPEND" FAILURE! ***'/)
          END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000224	74	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000114	38	RW,D,CON,LCL
$VARS	000200	64	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL

```
NTAPE6  000002     1            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015432  3469

NO FPP INSTRUCTIONS GENERATED

OPT4,LP/LI:1=OPT4/NOTR
```

```
      SUBROUTINE OPTS
      IMPLICIT INTEGER(A-Z)
      LOGICAL*1 APPEND
      COMMON/MTAPE0/NIN(300),NOUT(300)
      COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
      COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
      COMMON/MTAPE3/NBF(1324),NBUF(1324)
      COMMON/MTAPE4/LST,IBEG
      COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
     1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
      COMMON/MTAPE6/APPEND
      DIMENSION ICARD(64)
      DATA IOATT,IOSUC,IEALN/0001400,1,-34/
      DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
      DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
      DATA MASK/0377/
      DATA MT0/0,2048,0,0,0,0/
      DATA MT1/0,2048,0,0,0,0/
C
C     END-OF-FILE(=5)
C
1000  CONTINUE
      NERR=0
      NEND=0
      IF(NOUTS.EQ.0)GO TO 1001
C>>>>>>>>DISK EOF
      CALL CLOSE(3)
      GO TO 1003
C>>>>>>>>TAPE EOF
1001  DO 1002 I=1,2
1002  CALL WTQIO(IOEOF,3,1,0,ISW(1))
      IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6000
      MT1(1)=-1
      CALL WTQIO(IOSPF,3,1,0,ISW(1),MT1,DSW)
      IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6000
1003  IBEG=1
      RETURN
6000  TYPE 100
      NERR=1
      RETURN
100   FORMAT(1X,'*** MT: EOF FAILURE! ***'/)
      END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000204	66	RW,I,CON,LCL
SPDATA	000014	6	RW,D,CON,LCL
SIDATA	000076	31	RW,D,CON,LCL
$VARS	000202	65	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL

```
MTAPE4  000004     2            RW,D,OVR,GBL
MTAPE5  000064    26            RW,D,OVR,GBL
MTAPE6  000002     1            RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015376  3455

NO FPP INSTRUCTIONS GENERATED

OPT5,LP/LI:1=OPT5/NOTR
```

```
              SUBROUTINE OPT6
              IMPLICIT INTEGER(A-Z)
              LOGICAL*1 APPEND
              COMMON/MTAPE0/NIN(300),NOUT(300)
              COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
              COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
              COMMON/MTAPE3/NBF(1324),NBUF(1324)
              COMMON/MTAPE4/LST,IBEG
              COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
              1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MTO(6),MT1(6),DSW
              COMMON/MTAPE6/APPEND
              DIMENSION ICARD(64)
              DATA IOATT,IOSUC,IEALN/0001400,1,-34/
              DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
              DATA IOSPF, EEOF,IOEOF/02440,-10,03000/
              DATA MASK/0377/
              DATA MTO/0,2048,0,0,0,0/
              DATA MT1/0,2048,0,0,0,0/
        C
        C     REWIND/SEARCH INPUT ONLY(=6)
        C
        1200  CONTINUE
              NEND=0
              NERR=0
              IF(NINS.EQ.0)GO TO 1222
        C>>>>>>>DISK REWIND
              REWIND 2
              GO TO 1203
        C>>>>>>>MT: REWIND
        1222  CALL WTQIO(IORWD,2,1,0,ISW(1),0,DSW)
              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6002
        1203  IF(NFILE.LE.1)GO TO 1204
              DO 1205 I=1,NFILE-1
              CALL GETADR(MTO,NBF(301))
              CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
              IF(IOSUC.NE.IAND(MASK,ISW(1)))GO TO 6000
              MTO(1)=1
        1205  CALL WTQIO(IOSPF,2,1,0,ISW(1),MTO,DSW)
        1204  DO 1210 J=1,NSKIP
              IF(NINS.EQ.0)GO TO 1201
        C>>>>>>>DISK SEARCH
              DO 1207 I=1,16
              READ(2,END=1202,ERR=6001)(ICARD(JJ),JJ=1,64)
              K=64*(I-1)+300
              DO 1207 JJ=1,64
        1207  NBF(K+JJ)=ICARD(JJ)
              GO TO 1210
        C>>>>>>>TAPE SEARCH
        1201  CALL GETADR(MTO,NBF(301))
              CALL WTQIO(IORLB,2,1,0,ISW(1),MTO,DSW)
              IF(IOSUC.EQ.IAND(MASK,ISW(1)))GO TO 1210
              IF(IAND(IEVER,MASK).EQ.IAND(MASK,ISW(1)))GO TO 6000
              IF(IAND(IEEOF,MASK).NE.IAND(MASK,ISW(1)))GO TO 1210
        1202  NEND=1
              GO TO 6000
        1210  CONTINUE
```

```
              IST=IST+100
              IST=IST-NTUPS
              RETURN
      6000    TYPE 100
              GO TO 6010
      6001    TYPE 101
              GO TO 6010
      6002    TYPE 102
      6010    NERR=1
              RETURN
      100     FORMAT(1X,'*** INPUT FILE "NSKIP" FAILURE! ***'/)
      101     FORMAT(1X,'*** INPUT FILE "NFILE" FAILURE! ***'/)
      102     FORMAT(1X,'*** MT: REWIND FAILURE! ***'/)
              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000712	229	RW,I,CON,LCL
$PDATA	000014	6	RW,D,CON,LCL
$IDATA	000246	83	RW,D,CON,LCL
$VARS	000210	68	RW,D,CON,LCL
$TEMPS	000004	2	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016266 3675

NO FPP INSTRUCTIONS GENERATED

OPT6.LP/LI:1=OPT6/NOTR

```
FORTRAN IV-PLUS V02-51E          11:42:14     10-AUG-80            PAGE 1
OPT7.FTN           /WR

             SUBROUTINE OPT7
             IMPLICIT INTEGER(A-Z)
             LOGICAL*1 APPEND
             COMMON/MTAPE0/NIN(300),NOUT(300)
             COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
             COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
             COMMON/MTAPE3/NBF(1324),NBUF(1324)
             COMMON/MTAPE4/LST,IREG
             COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
             1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
             COMMON/MTAPE6/APPEND
             DIMENSION ICARD(64)
             DATA IOATT,IOSUC,IEALN/0001400,1,-34/
             DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/O2400,0400,-4,02440,01000    /
             DATA IOSPF,IEEOF,IOEOF/02440,-10,03000/
             DATA MASK/O377/
             DATA MT0/0,2048,0,0,0,0/
             DATA MT1/0,2048,0,0,0,0/
       C
       C     CLOSE INPUT FILE
       C
       1300  CONTINUE
             NEND=0
             NERR=0
             IF(NINS.EQ.1)CALL CLOSE(2)
             RETURN
             END

PROGRAM SECTIONS

 NAME       SIZE                ATTRIBUTES

$CODE1   000032    13           RW,I,CON,LCL
$PDATA   000004     2           RW,D,CON,LCL
$IDATA   000004     2           RW,D,CON,LCL
$VARS    000200    64           RW,D,CON,LCL
MTAPE0   002260   600           RW,D,OVR,GBL
MTAPE1   000012     5           RW,D,OVR,GBL
MTAPE2   000012     5           RW,D,OVR,GBL
MTAPE3   012260  2648           RW,D,OVR,GBL
MTAPE4   000004     2           RW,D,OVR,GBL
MTAPE5   000064    26           RW,D,OVR,GBL
MTAPE6   000002     1           RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015120   3368

NO FPP INSTRUCTIONS GENERATED

OPT7,LP/LI:1=OPT7/NOTR
```

```
      SUBROUTINE OPTR
      IMPLICIT INTEGER(A-Z)
      LOGICAL*1 EXTIN,EXTOUT,APPEND
      COMMON/MTAPE0/NIN(300),NOUT(300)
      COMMON/MTAPE1/NSKIP,IST,NTOTI,NTUPS,NTOTO
      COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
      COMMON/MTAPE3/NBF(1324),NBUF(1324)
      COMMON/MTAPE4/LST,IBEG
      COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSUC,IEALN,IORWD
     1,IOWLB,IEVER,IOSPF,IEEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
      COMMON/MTAPE6/APPEND
      DIMENSION EXTIN(3),EXTOUT(3)
      DIMENSION ICARD(64)
      DATA YES,NO/'Y','N'/
      DATA EXTIN/'I','N','P'/
      DATA EXTOUT/'O','U','T'/
      DATA NEND,NERR,NFILE/0,0,0/
      DATA NSKIP,IST/1,1/
      DATA IOATT,IOSUC,IEALN/O001400,1,-34/
      DATA IORWD,IOWLB,IEVER,IOSPF,IORLB/O2400,O400,-4,O2440,O1000     /
      DATA IOSPF,IEEOF,IOEOF/O2440,-10,O3000/
      DATA MASK/O377/
      DATA MT0/0,2048,0,0,0,0/
      DATA MT1/0,2048,0,0,0,0/
C
C     GET FILE INFO(=8)
C
      APPEND=.FALSE.
900   TYPE 100
100   FORMAT(//1H$,'IS THE INPUT ON MAG. TAPE(Y/N)? ')
      READ(5,102,END=999,ERR=900)ANSER
102   FORMAT(A1)
      NINS=1
      IF(ANSER.EQ.NO)NINS=1
      NOUTS=1
901   TYPE 103
103   FORMAT(1H$'IS THE OUTPUT GOING TO MAG TAPE(Y/N)? ')
      READ(5,102,END=999,ERR=901)ANSER
      IF(ANSER.EQ.NO)NOUTS=1
      IF(NOUTS.EQ.1)GO TO 5
902   TYPE 104
104   FORMAT(1H$,'APPEND DATA? ')
      READ (5,102,END=999,ERR=902)ANSER
      IF(ANSER.EQ.YES)APPEND=.TRUE.
5     IF(NOUTS.EQ.0)GO  TO 151
C     RSX11  SUPPORTED FILE
903   TYPE 105
105   FORMAT(1H$,'OUTPUT FILE NAME= ')
      CALL FILEN(3,EXTOUT)
C
C     BEGINNING OF INPUT
C
151   IF(NINS.EQ.1)GO TO 155
904   TYPE 106
106   FORMAT(1H$'MT FILE NO.=(I3) ')
      READ(5,101,END=999,ERR=904)NFILE
```

```
101     FORMAT(I3)
        GO TO 14
155     TYPE 107
107     FORMAT(1HS,'INPUT FILE NAME= ')
        CALL FILEN(2,EXTIN)
        NFILE=1
14      RETURN
999     CALL EXIT
        END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000524	170	RW,I,CON,LCL
SPDATA	000010	4	RW,D,CON,LCL
SIDATA	000300	96	RW,D,CON,LCL
SVARS	000214	70	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 016126   3627

NO FPP INSTRUCTIONS GENERATED

```
FORTRAN IV-PLUS V02-51F          11:42:22     10-AUG-80            PAGE 3
OPTR.FTN           /WR

0001                SUBROUTINE FILEN(UNIT,EXT)
        C           THIS SUBROUTINE ACCEPTS THE NAME OF THE INPUT OR OUTPUT FILE
        C           FORM THE TTY DEVICE 5
        C           DEFAULT DEVICE
        C           UNLESS SPECIFIED IN INPUT STRING
        C           UNIT=UNIT NUMBER
        C           EXT = LOGICAL*1 BUFFER OF EXTENSION
        C
0002                IMPLICIT INTEGER(A-Z)
0003                LOGICAL*1 INSTR,DOT,BLNK,EXT
0004                DIMENSION INSTR(40)
0005                DIMENSION EXT(3)
0006                DATA BLNK,DOT/' ','.'/
        C
        C           INPUT FILE
0007    152         READ (5,99,END=999,ERR=152)(INSTR(I),I=1,40)
0008    99          FORMAT(40A1)
        C           CHECK FOR END OF LINE
0009                DO 1600 I=40,1,-1
0010                J=I
0011    1600        IF(INSTR(I).NE.BLNK)GO TO 1601
0012                TYPE 151
0013    151         FORMAT(1HS,'>')
0014                GO TO 152
0015    1601        DO 1602 I=1,J
0016                IF(INSTR(I).NE.BLNK) GO TO 1602
        C
        C
        C           BLANK DISCOVERED-COLLAPSE LINE BY ONE AND DECREASE CHARACTER COUNT
        C
0017                DO 1603 K=I,J-1
0018    1603        INSTR(K)=INSTR(K+1)
0019                INSTR(J)=BLNK
0020                J=J-1
0021                GO TO 1601
0022    1602        CONTINUE
0023                DO 103 I=1,J
0024    103         IF(INSTR(I).EQ.DOT) GO TO 25
0025                INSTR(J+1)=DOT
0026                INSTR(J+2)=EXT(1)
0027                INSTR(J+3)=EXT(2)
0028                INSTR(J+4)=EXT(3)
0029                J=J+4
0030    25          CALL SCAN(INSTR,J)
0031                CALL ASSIGN(UNIT,INSTR,J)
0032                RETURN
0033    999         CALL EXIT
0034                END


PROGRAM SECTIONS

 NAME       SIZE                 ATTRIBUTES

$CODE1   000472    157           RW,I,CON,LCL
$IDATA   000044     18           RW,D,CON,LCL
```

```
FORTRAN IV-PLUS V02-51E          11:42:22    10-AUG-80           PAGE 4
OPTR.FTN          /WR

SVARS    000060     24              RW,D,CON,LCL
STEMPS   000004      2              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000622   201

NO FPP INSTRUCTIONS GENERATED
```

```
C
      SUBROUTINE SCAN(BUF,LTH)
      IMPLICIT INTEGER(A-Z)
      LOGICAL*1 BUF,DEVICE
      DIMENSION BUF(1),DEVICE(4)
      DATA DEVICE/'S','Y','0',':'/
      DO 1 I=1,LTH
1     IF(BUF(I).EQ.DEVICE(4))RETURN
      LTH=LTH+4
      DO 2 I=LTH,5,-1
2     BUF(I)=BUF(I-4)
      DO 3 I=1,4
3     BUF(I)=DEVICE(I)
      RETURN
      END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000172	61	RW,I,CON,LCL
$IDATA	000012	5	RW,D,CON,LCL
$VARS	000006	3	RW,D,CON,LCL
$TEMPS	000002	1	RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000214 70

NO FPP INSTRUCTIONS GENERATED

OPTR,LP/LI:1=OPTR/NOTR

```
0001                SUBROUTINE OPTR
0002                IMPLICIT INTEGER(A-Z)
0003                LOGICAL*1 EXTIN,EXTOUT,APPEND
0004                COMMON/MTAPE0/NIN(300),NOUT(300)
0005                COMMON/MTAPE1/NSKIP,IST,NTOTI,NTOPS,NTOTO
0006                COMMON/MTAPE2/NEND,NERR,NFILE,NINS,NOUTS
0007                COMMON/MTAPE3/NBF(1324),NBUF(1324)
0008                COMMON/MTAPE4/LST,IBEG
0009                COMMON/MTAPE5/MASK,ISW(2),IOATT,IOSDC,IFALN,IORWD
                   1,IOWLB,IFVER,IOSPF,IFEOF,IOEOF,IORLB,MT0(6),MT1(6),DSW
0010                COMMON/MTAPE6/APPEND
0011                DIMENSION EXTIN(3),EXTOUT(3)
0012                DIMENSION ICARD(64)
0013                DATA YES,NO/'Y','N'/
0014                DATA EXTIN/'I','N','P'/
0015                DATA EXTOUT/'O','U','T'/
0016                DATA NEND,NERR,NFILE/0,0,0/
0017                DATA NSKIP,IST/1,1/
0018                DATA IOATT,IOSDC,IFALN/0001400,1,-34/
0019                DATA IORWD,IOWLB,IFVER,IOSPF,IORLB/02400,0400,-4,02440,01000     /
0020                DATA IOSPF,IFEOF,IOEOF/02440,-10,03000/
0021                DATA MASK/0377/
0022                DATA MT0/0,2048,0,0,0,0/
0023                DATA MT1/0,2048,0,0,0,0/
          C
          C         GET FILE INFO(=8)
          C
0024                APPEND=.FALSE.
          C900      TYPE 100
          C100      FORMAT(//1H$,'IS THE INPUT ON MAG. TAPE(Y/N)? ')
          C         READ(5,102,END=999,ERR=900)ANSER
0025                ANSER=NO
0026      102       FORMAT(A1)
0027                NINS=1
0028                IF(ANSER.EQ.NO)NINS=1
0029                NOUTS=1
          C901      TYPE 103
          C103      FORMAT(1H$'IS THE OUTPUT GOING TO MAG TAPE(Y/N)? ')
          C         READ(5,102,END=999,ERR=901)ANSER
0030                ANSER=NO
0031                IF(ANSER.EQ.NO)NOUTS=1
0032                IF(NOUTS.EQ.1)GO TO 5
0033      902       TYPE 104
0034      104       FORMAT(1H$,'APPEND DATA? ')
0035                READ (5,102,END=999,ERR=902)ANSER
0036                IF(ANSER.EQ.YES)APPEND=.TRUE.
0037      5         IF(NOUTS.EQ.0)GO  TO 151
          C         RSX11  SUPPORTED FILE
          C903      TYPE 105
          C105      FORMAT(1H$,'OUTPUT FILE NAME= ')
          C         CALL FILEN(3,EXTOUT)
0038                CALL ASSIGN(3,'NL:')
          C
          C         BEGINNING OF INPUT
          C
0039      151       IF(NINS.EQ.1)GO TO 155
```

```
0040      904     TYPE 106
0041      106     FORMAT(1HS'ML FILE NO.=(I3) ')
0042              READ(5,101,END=999,ERR=904)NFILE
0043      101     FORMAT(I3)
0044              GO TO 14
0045      155     CONTINUE
          C155    TYPE 107
          C107    FORMAT(1HS,'INPUT FILE NAME= ')
          C       CALL FILEN(2,EXTIN)
0046              CALL ASSIGN(2,'I5,100IVOICEA.BIN',17)
0047              NFILE=1
0048      14      RETURN
0049      999     CALL EXIT
0050              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
SCODE1	000330	108	RW,I,CON,LCL
SPDATA	000042	17	RW,D,CON,LCL
SIDATA	000100	32	RW,D,CON,LCL
SVARS	000214	70	RW,D,CON,LCL
MTAPE0	002260	600	RW,D,OVR,GBL
MTAPE1	000012	5	RW,D,OVR,GBL
MTAPE2	000012	5	RW,D,OVR,GBL
MTAPE3	012260	2648	RW,D,OVR,GBL
MTAPE4	000004	2	RW,D,OVR,GBL
MTAPE5	000064	26	RW,D,OVR,GBL
MTAPE6	000002	1	RW,D,OVR,GBL

TOTAL SPACE ALLOCATED = 015564   3514

NO FPP INSTRUCTIONS GENERATED

```
0001              SUBROUTINE FILEN(UNIT,EXT)
          C       THIS SUBROUTINE ACCEPTS THE NAME OF THE INPUT OR OUTPUT FILE
          C       FORM THE TTY DEVICE 5
          C       DEFAULT DEVICE
          C       UNLESS SPECIFIED IN INPUT STRING
          C       UNIT=UNIT NUMBER
          C       EXT = LOGICAL*1 BUFFER OF EXTENSION
          C
0002              IMPLICIT INTEGER(A-Z)
0003              LOGICAL*1 INSTR,DOT,BLNK,EXT
0004              DIMENSION INSTR(40)
0005              DIMENSION EXT(3)
0006              DATA BLNK,DOT/' ','.'/
          C
          C       INPUT FILE
0007      152     READ (5,99,END=999,ERR=152)(INSTR(I),I=1,40)
0008      99      FORMAT(40A1)
          C       CHECK FOR END OF LINE
0009              DO 1600 I=40,1,-1
0010              J=I
0011      1600    IF(INSTR(I).NE.BLNK)GO TO 1601
0012              TYPE 151
0013      151     FORMAT(1H$,'>')
0014              GO TO 152
0015      1601    DO 1602 I=1,J
0016              IF(INSTR(I).NE.BLNK) GO TO 1602
          C
          C
          C       BLANK DISCOVERED-COLLAPSE LINE BY ONE AND DECREASE CHARACTER COUNT
          C
0017              DO 1603 K=I,J-1
0018      1603    INSTR(K)=INSTR(K+1)
0019              INSTR(J)=BLNK
0020              J=J-1
0021              GO TO 1601
0022      1602    CONTINUE
0023              DO 103 I=1,J
0024      103     IF(INSTR(I).EQ.DOT) GO TO 25
0025              INSTR(J+1)=DOT
0026              INSTR(J+2)=EXT(1)
0027              INSTR(J+3)=EXT(2)
0028              INSTR(J+4)=EXT(3)
0029              J=J+4
0030      25      CALL SCAN(INSTR,J)
0031              CALL ASSIGN(UNIT,INSTR,J)
0032              RETURN
0033      999     CALL EXIT
0034              END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000472	157	RW,I,CON,LCL
$IDATA	000044	18	RW,D,CON,LCL

```
$VARS   000060    24          RW,D,CON,LCL
$TEMPS  000004     2          RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000622   201

NO FPP INSTRUCTIONS GENERATED
```

```
FORTRAN IV-PLUS V02-51E          21:16:27    11-SEP-80           PAGE 5
OPTRA.FTN          /DE/WR

        C
0001            SUBROUTINE SCAN(BUF,LTH)
0002            IMPLICIT INTEGER(A-Z)
0003            LOGICAL*1 BUF,DEVICE
0004            DIMENSION BUF(1),DEVICE(4)
0005            DATA DEVICE/'S','Y','0',':'/
0006            DO 1 I=1,LTH
0007      1     IF(BUF(I).EQ.DEVICE(4))RETURN
0008            LTH=LTH+4
0009            DO 2 I=LTH,5,-1
0010      2     BUF(I)=BUF(I-4)
0011            DO 3 I=1,4
0012      3     BUF(I)=DEVICE(I)
0013            RETURN
0014            END

PROGRAM SECTIONS

 NAME       SIZE                 ATTRIBUTES

SCODE1  000172    61             RW,I,CON,LCL
SIDATA  000012     5             RW,D,CON,LCL
SVARS   000006     3             RW,D,CON,LCL
STEMPS  000002     1             RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000214    70

NO FPP INSTRUCTIONS GENERATED

OPTRA,LP/LI:1=OPTRA/DE/NOTR
```

```
        C         PREMAP.FTN       ORIGINATED:29-MAY-79
        C                          UPDATED:04-JUN-79
        C         THIS PROGRAM INTERPRETS ASCII TEXT FILES FOR THE MAP
        C         ASSEMBLER AND ALIGNS ALL FIELDS W/ SPACES AND REMOVES
        C         ALL TABS. ALL FILES ARE ASSUMED TO BE 120 COLUMNS WIDE.
        C         OUTPUT LINE FORMAT:
        C         COLUMNS 1,2...7                  LABEL
        C         COLUMN 8                         BLANK
        C         COLUMNS 9,10...55                SOURCE CODE
        C         COLUMN 56                        BLANK
        C         COLUMNS 57,58...120              COMMENTS
        C
0001              BYTE BLANK,TAB,HYPHEN,STAR,CR,DUMMY,SCOLON
0002              BYTE ALAST
0003              BYTE A(200),L(200)
0004              LOGICAL*1 IN(3),OUT(3),OUTPUT
0005              DATA IN/'T','X','T'/,OUT/'M','A','P'/
0006              DATA BLANK,TAB,HYPHEN,STAR,CR,SCOLON/040,011,047,052,015,073/
        C
0007    2         TYPE 100
0008              CALL FILEN(2,IN)
0009              TYPE 101
0010              CALL FILEN(3,OUT)
0011              LINE=0
        C
        C         READ EACH SOURCE "LINE"
        C
0012    1         LINE=LINE+1
0013              OUTPUT=.TRUE.
0014              READ(2,102,END=200,ERR=300)(A(I),I=1,120)
        C
        C         "BLANK" OUT OUTPUT LINE
        C
0015              DO 10 I=1,120
0016    10        L(I)=BLANK
        C
        C         SPECIAL LINE OPERATORS
        C
0017              IF(A(1).EQ.HYPHEN)GO TO 70
0018              IF(A(1).EQ.STAR)GO TO 70
0019              IF(A(1).EQ.SCOLON)GO TO 70
        C
        C         LABEL FIELD
        C
0020              I=1
0021    11        IF(A(I).EQ.TAB)GO TO 12
0022              L(I)=A(I)
0023              I=I+1
0024              IF(I.GT.120)GO TO 80
0025              GO TO 11
0026    12        NEXT=I+1
        C
        C         COMMAND FIELD
        C
0027              J=0
0028              I=NEXT
```

```
0029     21      IF(A(I).EQ.TAB)GO TO 22
0030             L(9+J)=A(I)
0031             J=J+1
0032             IF(J.GT.111)GO TO 80
0033             I=I+1
0034             IF(I.GT.120)GO TO 80
0035             GO TO 21
0036     22      NEXT=I+1
         C
         C       COMMENT FIELD
         C
0037     30      K=0
0038             I=NEXT
0039     31      IF(A(I).EQ.TAB)GO TO 80
0040             IF(ALAST.EQ.BLANK.AND.A(I).EQ.BLANK)GO TO 80
0041             IF(A(I).EQ.CR)GO TO 80
0042             ALAST=A(I)
0043             OUTPUT=.TRUE.
0044             L(57+K)=A(I)
0045             K=K+1
0046             IF(K.LE.23)GO TO 32
0047             WRITE(3,106)(L(II),II=1,120)
0048             DO 33 II=1,120
0049     33      L(II)=BLANK
0050             L(1)=SCOLON
0051             K=0
0052             OUTPUT=.FALSE.
0053             ALAST=BLANK
0054     32      I=I+1
0055             IF(I.GT.120)GO TO 80
0056             GO TO 31
         C
         C       COPY LINE "EN TOTO"
         C
0057     70      DO 71 I=1,120
0058     71      L(I)=A(I)
         C
         C       GENERATE CORRECTED OUTPUT LINE
         C
0059     80      IF(OUTPUT.EQ..TRUE.)WRITE(3,106)(L(I),I=1,120)
0060             GO TO 1
         C
         C       NORMAL EXIT
         C
0061     200     CALL CLOSE(2)
0062             CALL CLOSE(3)
0063             TYPE 103,LINE
0064             STOP
         C
         C       ABNORMAL EXIT
         C
0065     300     CALL CLOSE(2)
0066             CALL CLOSE(3)
0067             TYPE 104,LINE
0068             GO TO 2
         C
```

```
        C       LINE STRUCTURE ERROR
        C
0069    400     CALL CLOSE(2)
0070            CALL CLOSE(3)
0071            TYPE 105,LINE
0072            STOP
        C
        C       FORMAT DECLARATIONS
        C
0073    100     FORMAT(1H$,'INPUT FILENAME= ')
0074    101     FORMAT(1H$,'OUTPUT FILENAME= ')
0075    102     FORMAT(120A1)
0076    103     FORMAT(1X,'NORMAL EXIT AFTER ',I3,' LINES!'/)
0077    104     FORMAT(1X,'***WARNING*** FILE ERROR IN LINE ',I3/)
0078    105     FORMAT(1X,'***WARNING*** LINE STRUCTURE ERROR IN LINE ',I3/)
0079    106     FORMAT(120A1)
0080    107     FORMAT(1X,100S)
0081            END


PROGRAM SECTIONS

 NAME       SIZE                  ATTRIBUTES

$CODE1  001374   382              RW,I,CON,LCL
$PDATA  000010     4              RW,D,CON,LCL
$IDATA  000304    98              RW,D,CON,LCL
$VARS   000654   214              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 002564   698

NO FPP INSTRUCTIONS GENERATED

PREMAP,LP/LI:1=PREMAP
```

```
0001                  SUBROUTINE FILEN(UNIT,EXT)
             C
             C        THIS SUBROUTINE ACCEPTS THE NAME OF THE INPUT OR OUTPUT FILE
             C        FORM THE TTY DEVICE 5
             C        DEFAULT DEVICE
             C        UNLESS SPECIFIED IN INPUT STRING
             C        UNIT=UNIT NUMBER
             C        EXT = LOGICAL*1 BUFFER OF EXTENSION
             C
0002                  IMPLICIT INTEGER(A-Z)
0003                  LOGICAL*1 INSTR,DOT,BLNK,EXT
0004                  DIMENSION INSTR(40)
0005                  DIMENSION EXT(3)
0006                  DATA BLNK,DOT/' ','.'/
             C
             C        INPUT FILE
0007         152      READ (5,99)(INSTR(I),I=1,40)
0008         99       FORMAT(40A1)
             C        CHECK FOR END OF LINE
0009                  DO 1600 I=40,1,-1
0010                  J=I
0011         1600     IF(INSTR(I).NE.BLNK)GO TO 1601
0012                  TYPE 151
0013         151      FORMAT(1H$,'>')
0014                  GO TO 152
0015         1601     DO 1602 I=1,J
0016                  IF(INSTR(I).NE.BLNK) GO TO 1602
             C
             C
             C        BLANK DISCOVERED-COLLAPSE LINE BY ONE AND DECREASE CHARACTER COUNT
             C
0017                  DO 1603 K=I,J-1
0018         1603     INSTR(K)=INSTR(K+1)
0019                  INSTR(J)=BLNK
0020                  J=J-1
0021                  GO TO 1601
0022         1602     CONTINUE
0023                  DO 103 I=1,J
0024         103      IF(INSTR(I).EQ.DOT) GO TO 25
0025                  INSTR(J+1)=DOT
0026                  INSTR(J+2)=EXT(1)
0027                  INSTR(J+3)=EXT(2)
0028                  INSTR(J+4)=EXT(3)
0029                  J=J+4
0030         25       CALL SCAN(INSTR,J)
0031                  CALL ASSIGN(UNIT,INSTR,J)
0032                  RETURN
0033                  END
```

PROGRAM SECTIONS

NAME	SIZE		ATTRIBUTES
$CODE1	000444	146	RW,I,CON,LCL
$IDATA	000042	17	RW,D,CON,LCL

```
FORTRAN IV-PLUS V02-51E          13:28:11    10-AUG-80           PAGE 2
FILEN.FTN        /WR

$VARS    000060    24            RW,D,CON,LCL
$TEMPS   000004     2            RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000572   189

NO FPP INSTRUCTIONS GENERATED
```

```
FORTRAN IV-PLUS V02-51E          13:28:14     10-AUG-80           PAGE 3
FILEN.FTN          /WR

          C
0001                  SUBROUTINE SCAN(BUF,LTH)
0002                  IMPLICIT INTEGER(A-Z)
0003                  LOGICAL*1 BUF,DEVICE
0004                  DIMENSION BUF(1),DEVICE(4)
0005                  DATA DEVICE/'S','Y','0',':'/
0006                  DO 1 I=1,LTH
0007          1       IF(BUF(I).EQ.DEVICE(4))RETURN
0008                  LTH=LTH+4
0009                  DO 2 I=LTH,5,-1
0010          2       BUF(I)=BUF(I-4)
0011                  DO 3 I=1,4
0012          3       BUF(I)=DEVICE(I)
0013                  RETURN
0014                  END

PROGRAM SECTIONS

 NAME       SIZE                    ATTRIBUTES

$CODE1   000172     61              RW,I,CON,LCL
$IDATA   000012      5              RW,D,CON,LCL
$VARS    000006      3              RW,D,CON,LCL
$TEMPS   000002      1              RW,D,CON,LCL

TOTAL SPACE ALLOCATED = 000214     70

NO FPP INSTRUCTIONS GENERATED

FILEN,LP/LI:1=FILEN/NOTR
```

END

DATE
FILMED
12-80

DTIC